U.S. Fish & Wildlife Service

Driftless Area
National Wildlife Refuge

Draft Environmental Impact Statement and Draft Comprehensive Conservation Plan

The mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.
Mission of the National Wildlife Refuge System

Comprehensive Conservation Plans provide long-term guidance for management decisions; set forth goals, objectives and strategies needed to accomplish refuge purposes; and, identify the Fish and Wildlife Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

IN REPLY REFER TO:
NWRS/CP

APR 11 2005

Dear Reviewer:

We are pleased to provide you with this Draft Comprehensive Conservation Plan and Environmental Impact Statement for the Driftless Area National Wildlife Refuge.

The Refuge was established in 1989 under the authority of the Endangered Species Act of 1973 for the protection and recovery of the federally listed threatened Northern monkshood plant and the endangered Iowa Pleistocene snail.

The Plan will guide management for the next 15 years and help the Refuge meet its original purpose and contribute to the mission of the National Wildlife Refuge System. The Plan will provide both broad and specific guidance on various issues; set a vision, goals, and measurable objectives; and outline strategies for reaching those objectives.

We invite your review of the Plan and Environmental Impact Statement, and most importantly, your comment and counsel to help ensure the Final Plan is both visionary and practical. We will host an open house where you will be able to ask questions, seek understanding, and voice concerns and suggestions. A meeting date and location will be announced through the media and other means.

Written comments are also welcome during the 60-day comment period and should be addressed to: Driftless Area NWR, CCP Comment, 401 Business Highway 18N, P.O. Box 460, McGregor, IA, 52157. You may also send comments to us through the following web address: http://www.fws.gov/midwest/planning/DriftlessArea/index.html. To be considered in preparing the Final Plan, comments must be received by July 22, 2005.

We look forward to continuing the dialogue on the future of the Refuge, and thank you for your continued interest in keeping this Refuge a special place.

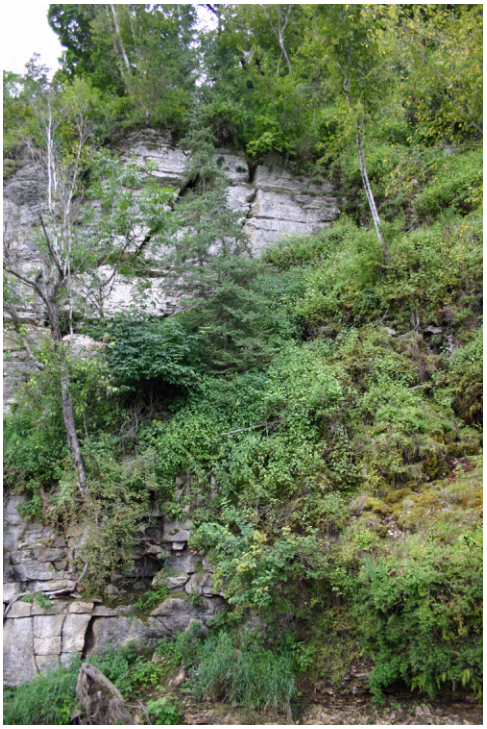
Sincerely,

Thomas J. Larson

Thomas J. Larson
Chief, Conservation Planning

Summary
Draft Environmental Impact Statement for Driftless Area National Wildlife Refuge Comprehensive Conservation Plan

May 2005



Algific talus slope on Driftless Area NWR. USFWS

Introduction

This document is an integrated Draft Comprehensive Conservation Plan (CCP) and Environmental Impact Statement (EIS) for the Driftless Area National Wildlife Refuge (NWR) in Iowa. The Driftless Area National Wildlife Refuge was established in 1989 with the purpose of conserving threatened and endangered species. Specifically, the Refuge conserves populations of the endangered Iowa Pleistocene snail and threatened Northern monkshood. These species occur on a rare and fragile habitat type termed algific talus slopes (cold air slopes). These are areas where cold underground air seeps onto slopes to provide a constant cold microenvironment. This habitat harbors species, some of which date from the Ice Age, that require a cold environment.

The National Wildlife Refuge System Improvement Act of 1997 requires all national wildlife refuges to complete a CCP to describe Refuge management for a 15-year time frame. Refuge management is currently guided by endangered species recovery plans, general policies, and shorter-term plans. The CCP and preferred alternative in the EIS describe the direction for the Refuge for the next 15 years (2005-2020). The aim is to conserve enough populations of the above species to reach recovery goals, as well as conserve unique algific talus slope habitat and the associated community of rare plants and animals. This plan also describes habitat restoration and management for other wildlife that includes the use of prescribed fire. Visitor services goals are also part of the plan. The CCP that ultimately arises from this Draft CCP and EIS will help ensure that management and administration of the Refuge meets the mission of the Refuge System, the purpose for which the Refuge was established, and the goals for the Refuge.

The purposes and goals of the Refuge are directly tied to recovery plans which describe the steps needed to recover and conserve the Northern monkshood and Iowa Pleistocene snail. Because of the fragile nature of their habitat and the low number of populations for each of these species, the primary recovery goal for both species is protecting and conserving the majority of remaining populations and their habitat. The primary threats to the habitat are grazing, logging, sinkhole filling, erosion, pesticides, invasive species, and development. Therefore, it is desirable to protect land surrounding the endangered species habitat to provide a buffer area from some of these threats.

Achievement of the Refuge purpose will help reach endangered species recovery goals, which will lead to delisting. The Refuge has reached its existing approved acquisition acreage. The original authorized acquisition area for the Refuge was approximately 700 acres in eight counties in Iowa, Illinois, and Wisconsin (Figure A) (U.S. Fish and Wildlife Service 1986). A preliminary project proposal for Refuge expansion was approved in 1993. However, the Refuge did not pursue further study for the 1993 proposed expansion until the CCP process began in 2002. A Land Protection Plan is also included with the EIS that outlines the overall expansion plan for the Refuge. Since Refuge establishment, additional information indicates the need to expand the Refuge geographic area and acreage, and to address ecological issues related to protection of endangered species. The CCP will achieve the following Refuge goals:

Goal 1. Habitat: Conserve endangered species habitat and contribute to migratory bird and other wildlife habitats within a larger landscape.

Goal 2. Species Management: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

Goal 3. Visitor Services: Visitors understand and appreciate the role of the Refuge in protecting endangered species.

The Refuge consists of nine scattered tracts or 'units' totaling 781 acres containing upland hardwood forest, grassland, stream and riparian habitats. The current management practice is to protect endangered species habitat, restore other habitats to presettlement vegetation when possible, and control invasive species. Prescribed burning is used in habitat management. Two Refuge units are open for hunting, fishing, and wildlife observation and photography. Presentations and tours are given as requested and staff time allows. The Refuge is managed under the Upper Mississippi River National Wildlife Refuge Complex, which includes three Refuges. The Refuge office is co-located with the McGregor District of Upper Mississippi River NWFR. One full-time Refuge Operations Specialist is assigned to the Refuge.

Planning Issues

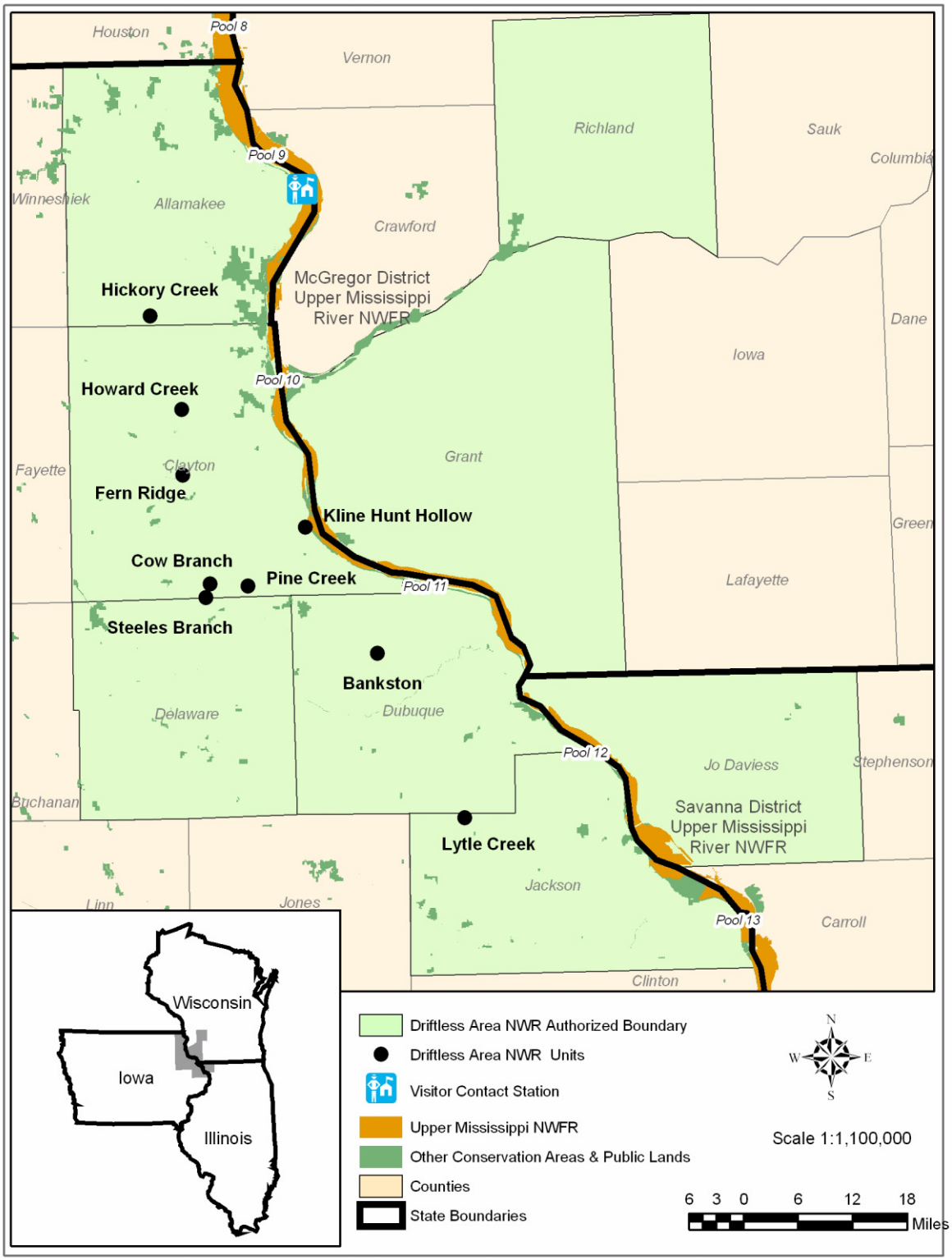
From public involvement activities that occurred when planning began in 2002, the Service learned about issues that concerned people about management of the Refuge. Refuge staff also identified issues. We organized the issues into four categories: Habitat Management, Visitor Services, Refuge Expansion, and Species Assessments.

Issue 1: Habitat Management

Land acquired for the Refuge typically has been impacted by agricultural or logging activities. Refuge lands are small parcels, often fragmented from similar habitat in the area. Current management is to restore as much as practical to presettlement habitat types around algific slopes, although lack of funds and staff limit restoration efforts. Several external factors are influencing management efforts on the Refuge. Invasive species such as garlic mustard are impacting endangered species and other wildlife habitat. High local deer populations may also impact habitat. Erosion from farming adjacent to the Refuge can affect habitat on the Refuge.

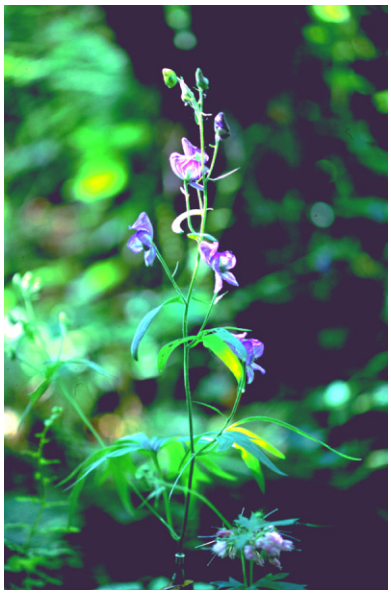
Potential solutions identified by the public were to develop management strategies for forests, including consideration of deer impacts, expand management of habitats surrounding endangered species habitat, and work to control invasive species.

Figure A: Current Driftless Area NWR Lands in Iowa



Issue 2: Visitor Services

Public use has not been emphasized on Driftless Area NWR because of concern for the fragile endangered species habitat, and the small size and lack of access to some units. Two of nine units are currently open to public use. Potential solutions suggested by the public were to maintain current hunting policies but increase awareness of regulations at the site, consider trail development in less sensitive areas, provide on-site information and education at select algific slopes while restricting direct access and negative impacts, provide guided walks, and encourage volunteers.



Northern monkshood. Bob Clearwater

Issue 3: Refuge Expansion

Refuge expansion will facilitate recovery goals and allow delisting of target species. Refuge land acquisition is aimed at protecting the entire algific slope system (endangered species habitat), including upland sinkholes and buffer area around the slope. Many of the currently protected algific slopes do not have adequate protection of sinkholes nor provide buffer from adjacent agricultural or other uses. Conservation of additional snail and monkshood populations is also needed to preserve genetic diversity over their range and protect the majority of the populations as required by the recovery plans. In addition, protection of Service species of concern may preclude the need for future listing and would conserve a unique representative natural community and its biodiversity.

Potential approaches raised by the public were to investigate alternatives to acquisition (e.g. conservation easements), increase funding for land protection, connect parcels of land where possible and expand boundaries to roads, railroads, or more recognizable features.

Issue 4: Species Assessments

Additional information about algific talus slopes and the species that inhabit them is needed. For example, locations of sinkholes and specific information on distances and function of the cold air flow have not been studied. There are nearly 400 algific slopes/maderate cliffs in the Driftless Area, but not all are occupied by currently listed species. Few in-depth species surveys were done and many of the known algific slope sites were only visited once. There may be rare, endemic, or unidentified species in this habitat. It is important to know what plants and animals depend on this habitat to prepare effective management strategies. Although original surveys to locate this habitat type were systematic and comprehensive, some sites likely remain undiscovered.

Management Alternatives

The Service constructed a range of alternatives from ideas provided by the public and Refuge staff. Many of the ideas were identified at a "Manager for a Day Workshop" open to the public.

Three alternatives for future Refuge management are described: A) no action, B) habitat protection emphasis, and C) habitat protection, increased management, and integrated wildlife-dependent recreation. Our preferred alternative is identified as Alternative C. This EIS considers the biological, environmental and socioeconomic effects that the three alternatives would have on the most significant issues and concerns identified during the planning process.

Alternative A: No Action: Status Quo (No Action)

This alternative assumes no change from past management programs and is considered the base from which to compare the other alternatives. There would be no lands added to the Refuge and no major changes in habitat management or public use programs. The Refuge would assist others in protection of additional endangered species habitat.

The primary consequence of this alternative is that endangered species recovery would likely not occur. Minimal management of other habitats may result in increased invasive species, increased erosion, and undesirable wildlife habitat. There would be no change in public support for the Refuge mission and no increase in public use opportunities.

Alternative B: Habitat Protection Emphasis

The approved acquisition area is proposed to be 6,000 acres in 22 counties in Illinois, Iowa, Minnesota, and Wisconsin. The primary emphasis of the Refuge would be land acquisition and other forms of habitat protection to expand the Refuge by 3,400 acres in the next 15 years for endangered species recovery and proactive protection of species of concern. This alternative also emphasizes minimal physical disturbance of endangered species habitat. Alternative B is primarily aimed at reaching habitat protection recovery goals for both species with more land acquisition than Alternative C. Some aspects of recreation, habitat restoration and control of invasive species would be at current levels and some would be reduced. The amount of public use would be monitored.

Coyote. USFWS

Although this alternative would make significant progress to permanent protection of habitat, recovery would likely not occur under this alternative because it would not address multiple recovery tasks that are needed to delist species. Other rare species would be protected under this alternative, but no further information would be gained on them. The physical environment of algific talus slopes would be more strictly protected under this alternative. Land acquisition would also protect water quality, soils, and aesthetic qualities of the region. Less habitat restoration under this alternative may result in increased invasive species and erosion. There would be no change in public support for the Refuge.

Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation (Preferred Alternative)

The approved acquisition area is proposed to be 6,000 acres in 22 counties in Illinois, Iowa, Minnesota, and Wisconsin. This alternative would provide for expansion of the Refuge by 2,275 acres in the next 15 years for endangered species recovery and proactive protection of species of concern. Alternative C includes increased land acquisition for recovery and delisting of the Iowa Pleistocene snail. Many of the recovery goals addressed for the snail would also benefit Northern monkshood. More active management of Refuge lands and endangered species habitat would take place under Alternative C to meet multiple recovery tasks for delisting of the Iowa Pleistocene snail. Restoration of forest habitat would be increased; there would be increased attention to control of invasive species, and inventory of plants and wildlife. Public use would be increased for environmental education and wildlife observation only where adequate public access and sufficient buffer areas around endangered species habitat exist. The amount of public use would be monitored.

The consequences of Alternative C include delisting the Iowa Pleistocene snail, habitat restoration that would benefit other wildlife species, and improved water quality and soils. Other rare species would also benefit. There would be greater potential to impact habitats with more emphasis on study and management, as well as greater emphasis on public use. However, these increases are minor and minimized by conducting work in specific ways.

The following apply to all alternatives:

- Cultural resources would be managed the same as under current Refuge management.
- Endangered species habitat would remain closed to all public entry.
- At least the current level of public use would remain under all alternatives.
- Prescribed fire would be used under each alternative to manage habitats under the current approved Refuge fire plan.
- The Iowa Pleistocene snail and Northern monkshood recovery plans would be revised and updated.

The economic effects of the alternatives are also discussed in the EIS. Alternatives B and C would remove lands from agricultural and timber uses with associated economic losses. However, the additional Refuge acquisitions will be small parcels scattered over a large area. Refuge Revenue Sharing payments would continue and recreation on some of these lands would provide local income. Refuge budget and associated expenditures would increase the most under alternative C.

The cumulative impacts of the preferred alternative are delisting the Iowa Pleistocene snail, protection of other biological and physical resources, and beneficial habitat for wildlife. There is more potential for cumulative disturbance impact under the preferred alternative, but these are minor, and management actions would be completed in ways that minimize disturbance.

Abstract

Draft Environmental Impact Statement for the Driftless Area National Wildlife Refuge Comprehensive Conservation Plan

May 2005

Type of Action: Administrative
Lead Agency: U.S. Department of the Interior, Fish and Wildlife Service
Responsible Official:Robyn Thorson, Regional Director
U.S. Fish and Wildlife Service
Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

For further information: Cathy Henry
Refuge Operations Specialist
Driftless Area National Wildlife Refuge
PO Box 460
McGregor, IA 52157
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Abstract

The U. S. Fish and Wildlife Service is proposing to implement the Comprehensive Conservation Plan (CCP) for the Driftless Area National Wildlife Refuge (Refuge), Iowa. The CCP will guide management for the next 15 years. Three alternatives for future Refuge management are described: A) no action, B) habitat protection emphasis, and C) habitat protection, increased management, and integrated wildlife-dependent recreation. Our preferred alternative is identified as Alternative C. This Environmental Impact Statement considers the biological, environmental and socioeconomic effects that the three alternatives would have on the most significant issues and concerns identified during the planning process.

Alternative A: No Action: Status Quo – This alternative assumes no change from past management programs and is considered the base from which to compare the other alternatives. There would be no lands added to the Refuge and no major changes in habitat management or public use programs.

Alternative B: Habitat Protection Emphasis – The primary emphasis of the Refuge would be land acquisition and other forms of habitat protection to expand the Refuge by 3400 acres within 22 counties in Iowa, Illinois, Minnesota, and Wisconsin for endangered species recovery and proactive protection of species of concern. This alternative emphasizes minimal physical disturbance of endangered species habitat. Some aspects of recreation, habitat restoration and control of invasive species would be at current levels and some would be reduced. The amount of public use would be monitored.

Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation – This alternative would provide for expansion of the Refuge by 2,275 acres within 22 counties in Iowa, Illinois, Minnesota, and Wisconsin for endangered species recovery and proactive protection of species of concern. This alternative addresses multiple recovery goals for delisting of the Iowa Pleistocene snail through increased habitat management. Public use would be increased for environmental education and wildlife observation. The amount of public use would be monitored.

Reader's Guide

The U.S. Fish and Wildlife Service will manage the Driftless Area National Wildlife Refuge (NWR) in accordance with an approved Comprehensive Conservation Plan (CCP). The CCP provides long range guidance on Refuge expansion and management through its vision, goals, objectives, and strategies. The CCP also provides a basis for a long-term adaptive management process including implementation, monitoring progress, evaluating and adjusting, and revising plans accordingly. Additional step-down planning will be required prior to implementation of certain programs and projects.

This document combines both a Draft Comprehensive Conservation Plan and Environmental Impact Statement (Draft CCP/EIS). Following public review and comment, we will publish a Final EIS followed by a Record of Decision (ROD) that identifies the alternative selected as the CCP. We will then publish a stand-alone CCP made up of Chapter 1, the selected alternative from Chapter 2, all of Chapters 3, 5, and 6 and the appendices. The following chapter and appendix descriptions are provided to assist readers in locating and understanding the various components of this combined document.

Chapter 1, Introduction, Purpose and Need, and Issues, includes the regional context, establishment, and purposes of Driftless Area NWR; vision and goals for future management; and the purpose of and need for a comprehensive conservation plan. This chapter also provides background on major planning issues identified by Refuge staff, state and local agencies, and the general public.

Chapter 2, Alternatives, describes three management alternatives. Each alternative represents a potential comprehensive conservation plan for Driftless Area NWR. Alternative A describes current management on the Refuge. Alternative C, the preferred alternative, is the proposed Draft CCP for Driftless Area NWR.

Chapter 3, Affected Environment, describes the existing physical and biological environment, public uses, cultural resources, and socioeconomic conditions. They represent baseline conditions for the comparisons made in Chapter 4.

Chapter 4, Environmental Consequences, describes the potential impacts of each of the three alternatives on the resources, programs, and conditions outlined in Chapter 3. This is perhaps the most important part of the EIS component of this document.

Chapter 5, List of Preparers

Chapter 6, Consultation and Coordination with the Public and Others

Chapter 7, Reserved for Public Comments on Draft EIS

Chapter 8, References Cited

Appendices

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National Wildlife Refuge

Draft Environmental Impact Statement/ Comprehensive Conservation Plan

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Chapter 1: Introduction, Purpose and Need, Planning Background

Algific slope located on Driftless Area NWR. USFWS

1.1 Introduction

This document is an integrated Draft Comprehensive Conservation Plan (CCP) and Environmental Impact Statement (EIS) for the Driftless Area National Wildlife Refuge (Refuge). It will follow the basic and accepted format for an EIS and each alternative presented will contain the core of a CCP, namely goals, objectives, and strategies. Since it is an integrated document designed to meet the requirements for both an EIS and a CCP, some sections in the EIS format were expanded (notably Chapter 1, Planning Background) to meet this dual function. In addition, various referenced appendices relate to either the EIS, CCP, or both, as applicable.

The Driftless Area NWR was established in 1989 under the authority of the Endangered Species Act of 1973 for the protection and recovery of the federally threatened Northern monkshood plant (*Aconitum noveboracense*) and endangered Iowa Pleistocene snail (*Discus macclintocki*). These species primarily occur on a rare and fragile habitat type termed algific talus slopes (cold air slopes). The habitat harbors species that require a cold environment, some of which date from the ice age. The habitat is described in more detail in Chapter 3. These are areas where cold underground air seeps onto slopes to provide a constant cold microenvironment.

The National Wildlife Refuge System Improvement Act of 1997 requires all national wildlife refuges to complete a Comprehensive Conservation Plan to describe Refuge management for a 15 year time frame. The Comprehensive Conservation Plan and preferred alternative described herein will describe direction for the Refuge for the next 15 years (2005-2020) aimed at conserving enough populations of the above species to reach recovery goals, as well as conserving unique algific talus slope habitat and the associated community of rare plants and animals. The lands that are part of the Refuge also harbor other wildlife. Therefore, this plan describes general habitat restoration and management for other species. Refuges are for people, too. We describe how we envision a balance of public use and habitat preservation, within the National Wildlife Refuge System management principle that wildlife comes first. Detailed habitat, land acquisition, and visitor services management plans will be developed to provide further guidance for management activities.

We prepared this Environmental Impact Statement using guidelines of the National Environmental Policy Act of 1969. The Act requires us to examine the effects of proposed actions on the natural and human environment. In the following sections we describe three alternatives for future Refuge management, the environmental consequences of each alternative, and our preferred management direction. We designed each alternative as a mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities, and then we selected our alternative based on its environmental consequences and its ability to achieve the Refuge's purpose.

1.2 Purpose and Need for Action

1.2.1 Purpose

The purpose of this EIS is to adopt and implement a CCP for Driftless Area NWR. The Service is considering a range of alternatives of how best to manage the Refuge. A second purpose of the EIS is to present and adopt a Fire Management Plan (FMP) for the Refuge.

CCPs are designed to guide the management and administration of national wildlife refuges for a 15 year period, help ensure that each refuge meets the purpose for which it was established, and contribute to the overall mission of the Refuge System. The CCP helps describe a desired future condition of the Refuge, and provides both long-term and day-to-day guidance for management actions and decisions. It provides both broad and specific policy on various issues, sets goals and measurable objectives, and outlines strategies for reaching those objectives. A CCP also helps communicate to other agencies, and the public, a management direction for a refuge to meet the needs of wildlife and people.

A long-term management direction does not currently exist for Driftless Area NWR. Management is currently guided by endangered species recovery plans, general policies, and shorter-term plans. The Refuge Improvement Act of 1997 mandates that the Secretary of the Interior, and thus the Service, prepare CCPs for all units of the National Wildlife Refuge System by October, 2012. In addition to this mandate, there are several reasons why preparation of a CCP is needed at this time. There are new threats to endangered species habitat, new laws and policies have been put in place, new scientific information is available, and levels of public use and interest have increased.

The National Environmental Policy Act of 1969 requires that federal agencies, and thus the Service, follow basic requirements for major actions significantly affecting the quality of the human environment. These requirements are: 1) consider every significant aspect of the environmental impact of a proposed action, 2) involve the public in its decision-making process when considering environmental concerns, 3) use a systematic, interdisciplinary approach to decision making, and 4) consider a reasonable range of alternatives. This EIS documents those requirements and provides the necessary information and analysis to the decision-maker or responsible official.

Finally, the planning process is an excellent way to inform and involve the general public, state and federal agencies, and non-government groups who have an interest, responsibility, or authority in the management or use of certain aspects of Driftless Area NWR.

1.2.2 Need

The CCP that ultimately arises from this Draft CCP and EIS will help ensure that management and administration of the Refuge meets the mission of the Refuge System, the purpose for which the Refuge was established, and the goals for the Refuge. The mission, purpose, and goals are considered the needs or benchmarks for defining reasonable alternatives presented in Chapter 2.

The alternatives, along with an evaluation of consequences in Chapter 4, will form the basis for a decision. These three needs are summarized below. More detail on issues related to these needs can be found in Section 1.10 Planning Issues.

Need 1: Contribute to the Refuge System Mission. The mission of the National Wildlife Refuge System set forth in the Refuge Improvement Act of 1997 is:

> "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Need 2: Help Fulfill the Refuge Purpose. The Refuge purpose is defined by the Endangered Species Act of 1973; that is: to conserve fish or wildlife which are listed as endangered or threatened species or plants (16 USC 1534 ESA). Achievement of the Refuge purpose will help reach endangered species recovery goals that will lead to delisting.

The Refuge has reached its existing approved acquisition acreage. Since Refuge establishment, additional information indicates the need to expand the Refuge geographic area and acreage, as well as to address ecological issues related to protection of endangered species.

Need 3: Help Achieve Refuge Goals.

Goal 1. Habitat: Conserve endangered species habitat and contribute to migratory bird and other wildlife habitats within a larger landscape. Related needs are to:

- permanently conserve additional endangered species habitat to achieve delisting of the target species.
- permanently conserve additional habitat for glacial relict species of concern to preclude listing
- manage invasive species
- restore grassland and forest habitats
- assist others to manage off Refuge impacts to endangered species habitat

Goal 2. Species management: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats. Related needs are to:

- ensure all algific slopes and endangered species locations are known
- inventory plants and animals associated with algific talus slopes
- update the recovery plans for Iowa Pleistocene snail and Northern monkshood
- determine the amount of buffer area needed to adequately protect algific slopes
- assess deer impacts to the Refuge and endangered species

Goal 3. Visitor Services: Visitors understand and appreciate the role of the Refuge in protecting endangered species. Related needs are to:

- provide wildlife-dependent recreation while protecting endangered species habitat
- provide environmental education

1.3 Decision Framework

The Service's Regional Director (Region 3) in the Twin Cities, Minnesota is the responsible official for approving the Final CCP and EIS in a Record of Decision. The Record of Decision will identify the selected alternative that will become the Final CCP. The selected alternative will be one of the alternatives in this Draft CCP and EIS, although the final decision may reflect modification of certain elements of the alternatives based on public review and comment. The Final EIS will also contain individual substantive comments, or a summary of like-comments, received from the public, agencies, and other interested parties, along with a Service response.

1.4 Planning Background

Golden saxifrage. Bob Clearwater

1.4.1 Recovery Plans

The goal of the Endangered Species Act is the recovery of listed species to levels so that protection under the Act is no longer necessary. The U.S. Fish and Wildlife Service develops and implements recovery plans for species that are listed as threatened and endangered. These plans outline tasks necessary to stabilize and recover listed species.

1.4.1.1 Iowa Pleistocene Snail

The Iowa Pleistocene snail (*Discus macclintocki*) was listed as endangered in 1977 because of the small number of populations, small total population, and its very restricted and fragile habitat type. It is also listed as endangered by the states of Iowa and Illinois. The U.S. Fish and Wildlife Service completed a recovery plan in 1984 written by Dr. Terry Frest. At that time the snail was known from 18 small sites in Clayton and Dubuque Counties, Iowa and Jo Daviess County, Illinois. Fossil records indicate that the snail was once widely distributed in the Midwest during the Pleistocene era (approximately 300,000-500,000 YBP). It is therefore considered a glacial relict species and its habitat is restricted to cold algific talus slopes (see Section 3.2.2 for a description). Threats to the species and its habitat listed in the recovery plan are human disturbance, logging, grazing, road building, quarrying, sinkhole filling, pesticides, house construction, and natural factors such as rock slides and stream undercutting or weather related factors. An additional, more recent threat is invasive species.

The main features of the recovery plan are to gain control of algific talus slopes where the snail occurs and protect them from human disturbances. Restoration and monitoring are also stated as being important. The Iowa Pleistocene snail can be considered for reclassification from endangered to threatened if permanent protection of 16 of the existing colonies can be achieved and documentation of stable or increasing populations can be done. Delisting can be considered if stringent protection of at least 24 or more sufficiently dispersed viable breeding colonies is obtained. A viable population from a genetic standpoint would be a breeding population of 500; however, further study on this number is needed. Dr. Frest states that it is likely other sites remain to be found. Indeed, further surveys by him and others in the 1980s discovered a new total of 37 sites in Clayton, Clinton, Fayette, Delaware, Dubuque, Jackson Counties, Iowa and JoDaviess County, Illinois.

The basic premise of the recovery plan is to protect all of the sites with viable breeding colonies. Even though the number of sites has since increased, it still is not large and nearly all should be

protected for delisting. The recovery plan needs updating to include all known sites, new monitoring information, new threats, and to refine downlisting and delisting criteria. Although 22 snail sites currently have some protection, 12 of these need additional protection of algific slopes and/or sinkholes to be considered fully protected for delisting purposes. Some of the largest populations are not protected and the species needs protection across its range to preserve genetic differences and to protect against catastrophic events in one area.

1.4.1.2 Northern monkshood

Northern monkshood (*Aconitum noveboracense*) was listed as threatened in 1978 because of its limited range and habitat preference. It is also listed as threatened by the states of Iowa, Wisconsin, and New York and endangered in Ohio. A recovery plan was completed in 1983. It was one of the first plant species listed under the Endangered Species Act. Monkshood requires a cold soil environment associated with cliffs, talus slope, algific slope, or spring/headwater stream situations. Its habitat is typically in rugged areas and on fragile cliffs or slopes that cannot tolerate a great deal of disturbance. In 1983, there were 24 sites known in Iowa, Wisconsin, Ohio, and New York. The authors acknowledged that Iowa had the greatest potential for discovery of new sites. There are now 83 known sites in Iowa, 18 in Wisconsin, two in New York, and one in Ohio. Sites vary greatly in population size from just a few plants to thousands of plants. Threats are dams and reservoirs, road construction, power line maintenance, logging, quarrying, grazing, developments, scientific overcollecting, and natural events. On algific slope sites, disturbance or filling of the sinkholes is also a threat. More recently, invasive species, and in particular garlic mustard, have become a threat as well.

The primary goal of the recovery plan is to provide a basis for delisting by providing security for all known northern monkshood locations against damage or destruction of the existing habitats. This security could be in various forms of acquisition, easement, fencing, landowner awareness. Additional goals were searches for new sites, much of which was completed in the 1980s, and propagation research.

This recovery plan also needs revision to include all of the known sites, more recent research, and more precise downlisting and delisting criteria. The viable population size for protection efforts needs to be determined. Currently there are 45 monkshood sites in some form of permanent protection. Some of these are small populations. Similar to snail sites, many of the protected sites need additional slope/cliff, sinkhole, or buffer area protection to be considered fully protected for delisting purposes. Monkshood also needs additional protection across its range.

1.4.1.3 Leedy's Roseroot

Leedy's roseroot was listed as threatened in 1992 because of its low numbers, few and disjunct populations, and specialized cliffside habitat. It is also listed as threatened by the state of Minnesota. The recovery plan was approved in 1998. The plant is found in only specialized Cliffside habitat. In Minnesota, it occurs on maderate cliffs which are cooled by air exiting underground passages (see Section 3.2.2). There are only three populations in New York and four in Minnesota. One site in Minnesota is owned by the Department of Natural Resources. Besides its disjunct occurrences and low numbers, the major threats are on-site disturbances and groundwater contamination.

Leedy's roseroot may be considered for delisting when all three privately owned Minnesota populations are protected by conservation easements or fee title acquisition by a public agency or private conservation organization, the contamination threat is removed from the fourth Minnesota population, and specific protection measures are taken for New York populations. Protected populations must be geographically distinct, self-sustaining, and have been protected for five consecutive years by measures that will remain effective following delisting. Additional tasks needed include locating new populations, determining the hydrologic relationship of cliffs with upland areas, securing funding for site protection, securing landowner involvement, implementing monitoring, providing public education, and maintaining a genetic bank.

1.4.2 Previous Acquisition Planning

The original land protection plan (LPP, U.S. Fish and Wildlife Service 1986) for the Refuge outlined the purposes, objectives, protection alternatives, and proposed action for the Refuge related to land acquisition. The LPP called for protection of approximately 25 sites cumulatively containing approximately 700 acres in eight counties (Figure 1). A project of this size was expected to bring approximately 70 percent of the known Northern monkshood population and 75 percent of the known Iowa Pleistocene snail population under direct Service protection.

More locations occupied by these species have been discovered since the LPP and recovery plans were written. Currently known sites include 83 Northern monkshood sites in Iowa and 18 in Wisconsin. There are 36 known snail sites in Iowa and one in Illinois. Forty-five of the monkshood sites and 22 of the snail sites are in some form of permanent protection including Refuge, state, county, and Nature Conservancy lands.

In 1993, a preliminary project proposal (PPP) was approved by the Director of the Fish and Wildlife Service to develop a detailed plan to acquire up to an additional 6,220 acres in 25 counties in Illinois, Iowa, Minnesota, and Wisconsin to protect enough monkshood and snail sites to meet recovery plan goals. The PPP also added acquisition areas for the plant, Leedy's roseroot (*Sedum integrifolium ssp leedyi*), which was listed as threatened in 1992. The plant grows on similar maderate cliff habitat on four sites in southeast Minnesota. The primary recovery goal for Leedy's roseroot is permanent protection of all known sites on which it occurs (U.S. Fish and Wildlife Service 1998).

The PPP also aimed to protect other rare species associated with algific talus slopes and similar rare habitats. The plants golden saxifrage (*Chrysosplenium iowense*) and sullivantia (*Sullivantia sullivantia*) and eight species of glacial relict land snails are associated with algific talus slopes and similar habitats throughout the Driftless Area. At that time these were Category 2 candidate species for federal listing[1]. Some of these species occur only in the Driftless Area, or the majority of their populations occur in the Driftless Area. Known locations were documented during surveys done in the 1980s. Since that time, sullivantia was found to occur more commonly on cliff habitats in Wisconsin and Iowa. It is now only state listed in Illinois and Minnesota and is not a U.S. Fish and Wildlife Service species of concern. It was first thought to be specific to algific talus slopes and maderate cliffs, but is now considered relatively common on these, and other cliff habitats. Some of the counties proposed in the 1993 PPP were included only for protection of sullivantia and are no longer considered areas for potential acquisition (Figure 1). The other species are included in a preliminary draft species of concern list for Region 3. None are candidate species at this time. An updated status assessment for the snail species is currently being completed by the Service's Region 3 Division of Endangered Species.

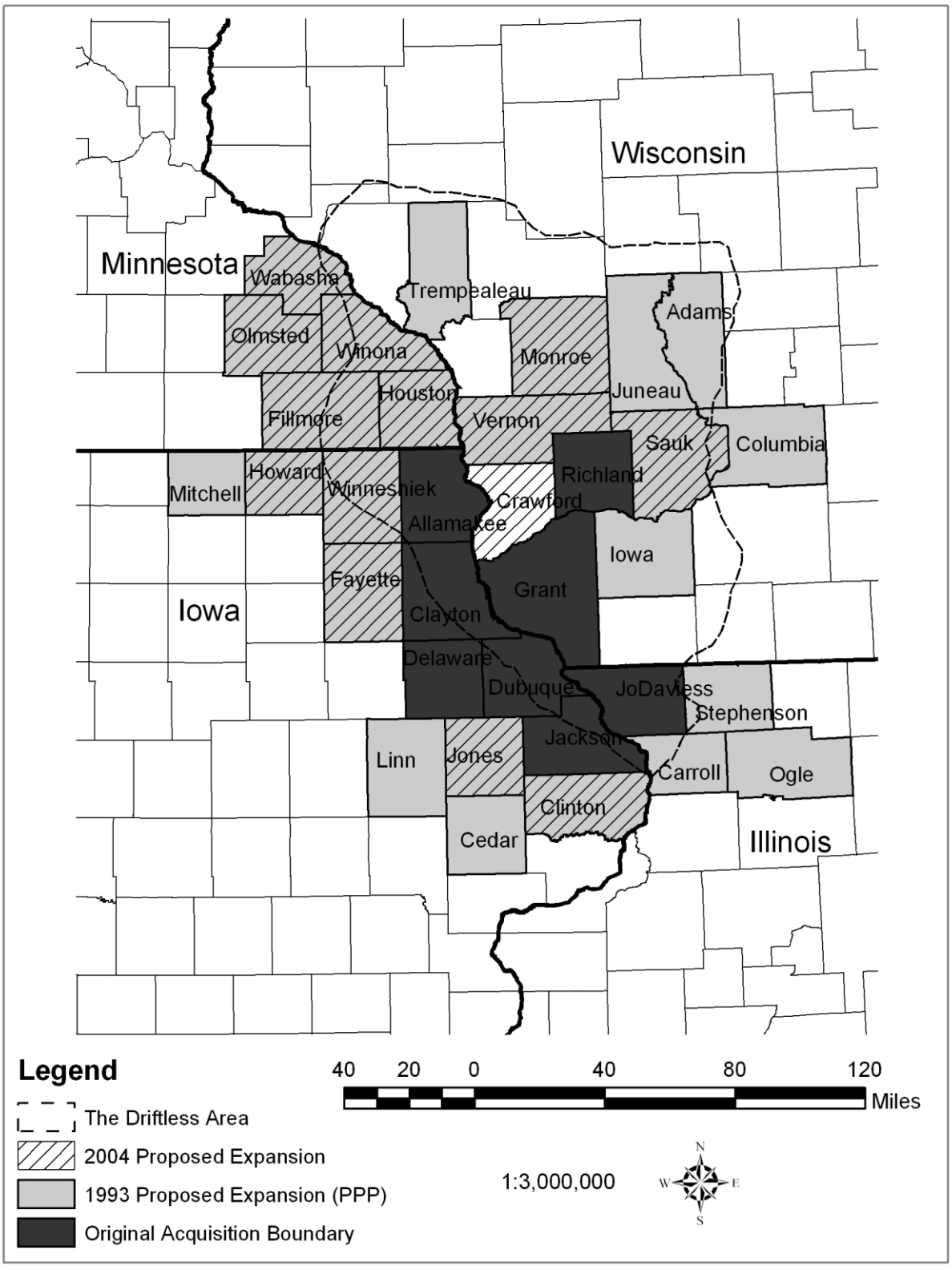
Mitchell County in Iowa contains only two sites which are already protected in a county park. Therefore, this county was removed from the 2004 expansion proposal. Crawford County, Wisconsin was added to the 2004 expansion proposal because of its potential to contain habitat for endangered species and species of concern.

1.4.3 Overview of the Planning Process

This CCP process began in April 2002 as part of the Upper Mississippi River NWR Complex CCP. The Complex consists of four districts on the Mississippi River, Trempealeau NWR in Wisconsin, and Driftless Area NWR in Iowa. Because of the different purpose, land base, and management needs of Driftless Area NWR, it is treated as a separate CCP following much of the same process and timeline as the Upper Mississippi Complex CCP.

1. *The Service discontinued the use of a list for "category 2 candidates" in 1996. None of these species are currently candidates for listing under the Endangered Species Act.*

Figure 1: Refuge Land Acquisition Boundaries



We are required to do detailed planning (Service policy) when we anticipate adding more than 40 acres to a refuge. Because the Refuge is proposing to expand its acquisition boundary in two of the alternatives, we completed a Land Protection Plan (Appendix I), which gives the details of the proposed expansion. The Refuge did not pursue detailed planning under the 1993 PPP until the CCP process began in 2002. The CCP effort was the logical time to examine all management and land protection issues related to the Refuge. The LPP addresses the total Refuge acreage desired for the life of the project and is a longer term plan than the CCP.

A stakeholder group was first formed with State agencies and the U.S. Army Corps of Engineers. Meetings with stakeholders were held to introduce the CCP and identify management issues and concerns. Because of the geographic area covered by the Upper Mississippi River Complex as well as the Driftless Area NWR, several public scoping meetings were held in the fall of 2002. Meetings about the Driftless Area NWR were held in Dubuque, Elkader, and Lansing, Iowa, and Prairie du Chien, Wisconsin. The purpose of these scoping meetings was to gather the public's issues and concerns. A 'Manager for a Day' workshop was held in February 2003 in Elkader, Iowa, to develop alternatives to the issues raised by the public and Refuge staff. Three project updates were also sent to approximately 2,600 citizens, non-governmental organizations, media, and legislators.

1.4.4 Legal and Policy Framework

Driftless Area NWR is managed and administered as part of the National Wildlife Refuge System within a framework of organizational setting, laws, and policy. Key aspects of this framework are outlined below. A list of other laws and executive orders that have guided preparation of the CCP and EIS, and guide future implementation, are provided in Appendix E.

The Driftless Area NWR is managed as part of the Upper Mississippi River National Wildlife and Fish Refuge Complex. The complex is completing a Comprehensive Conservation Plan for each unit, including Upper Mississippi River NWFR, Trempealeau NWR, and Driftless Area NWR. Because of the different purpose, land base, and management needs of Driftless Area NWR, this CCP is separate but following much the same time line and process as the other CCPs.

1.4.5 National Wildlife Refuge System Mission, Goals, and Principles

The mission of the U.S. Fish and Wildlife Service is to work with others to conserve, protect, and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.

The U.S. Fish and Wildlife Service is the primary Federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. Specific responsibilities include enforcing Federal wildlife laws, managing migratory bird populations, restoring nationally important fisheries, administering the Endangered Species Act, and restoring wildlife habitat such as wetlands. The Service also manages the National Wildlife Refuge System.

1.4.6 Goals of the National Wildlife Refuge System

The Refuge System had its beginning in 1903 when President Theodore Roosevelt issued an Executive Order to set aside tiny Pelican Island in Florida as a refuge and breeding ground for birds. From that small beginning, the Refuge System has become the world's largest collection of lands specifically set aside for wildlife conservation. The administration, management, and growth of the Refuge System are guided by the following goals (Director's Order, January 18, 2001):

- To fulfill our statutory duty to achieve refuge purposes and further the System mission.
- To conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.

- To perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- To conserve a diversity of fish, wildlife, and plants.
- To conserve and restore where appropriate representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- To foster understanding and instill appreciation of native fish, wildlife, and plants, and conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Northern Flicker. USFWS

The National Wildlife Refuge System is a network of more than 540 refuges encompassing 95 million acres of lands and waters, 41 wetland management districts that are responsible for 2.4 million acres of Waterfowl Production areas, and 50 coordination areas covering 317,000 acres that are managed by State fish and wildlife agencies under cooperative agreements. Refuge System lands span the continent from Alaska's Arctic tundra to the tropical forests in Florida and from the secluded atolls of Hawaii to the bogs of Maine.

National wildlife refuges are established for different purposes. Most refuges have been established for the conservation of migratory birds, while some have been established to provide habitat for endangered species. Others have been formed to protect and propagate large mammals such as bison, elk, and desert bighorn sheep. Refuge habitats consist of a great diversity of plants and animals.

Refuges also provide unique opportunities for people. When it is compatible with wildlife and habitat needs, refuges can be used for wildlife-dependent activities such as hunting, fishing, wildlife observation, photography, environmental education and environmental interpretation. Many refuges have visitor centers, wildlife trails, automobile tours, and environmental education programs. Nationwide, an estimated 39.5 million people visited national wildlife refuges in 2003.

The National Wildlife Refuge System Improvement Act of 1997 established many mandates aimed at making the management of national wildlife refuges more consistent. The preparation of comprehensive conservation plans is one of those mandates. The legislation requires the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the Refuge System.

1.4.7 The National Wildlife Refuge System Improvement Act of 1997 and Related Policy

The Improvement Act of 1997 amended the National Wildlife Refuge System Administrative Act of 1966 and became a true organic act for the System by providing a mission, policy direction, and management standards. Below is a summary of the key provisions of this landmark legislation, and subsequent policies to carry out the Act's mandates.

Established Broad National Policy for the Refuge System:

- Each refuge shall be managed to fulfill the mission and its purposes.
- Compatible wildlife-dependent recreation is a legitimate and appropriate use.

- Compatible wildlife-dependent uses are the priority public uses of the System.
- Compatible wildlife-dependent uses should be facilitated, subject to necessary restrictions.

Directed the Secretary of the Interior to:

- Provide for the conservation of fish, wildlife, and plants within the System.
- Ensure biological integrity, diversity, and environmental health of the System for the benefit of present and future generations.
- Plan and direct the continued growth of the System to meet the mission.
- Carry out the mission of the System and purposes of each refuge; if conflict between, purposes takes priority.
- Ensure coordination with adjacent landowners and the States.
- Assist in the maintenance of adequate water quantity and quality for refuges; acquire water rights as needed.
- Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the System.
- Ensure that opportunities for compatible wildlife-dependent recreation are provided.
- Ensure that wildlife-dependent recreation receive enhanced consideration over other uses of the System.
- Provide increased opportunities for families to enjoy wildlife-dependent recreation.
- Provide cooperation and collaboration of other federal agencies and States, and honor existing authorized or permitted uses by other Federal agencies .
- Monitor the status and trends of fish, wildlife, and plants in each refuge.

Provide Compatibility of Uses Standards and Procedures:

- New or existed uses should not be permitted, renewed, or expanded unless compatible with the mission of the System or the purpose(s) of the refuge, and consistent with public safety.
- Wildlife-dependent uses may be authorized when compatible and not inconsistent with public safety.
- The Secretary shall issue regulations for compatibility determinations.

Planning:

- Each unit of the Refuge System shall have a Comprehensive Conservation Plan completed by 2012.
- Planning should involve adjoining landowners, State conservation agencies, and the general public.

1.4.7.1 Compatibility Policy

No uses for which the Service has authority to regulate may be allowed on a unit of the Refuge System unless it is determined to be compatible. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge. Managers must complete a written compatibility determination for each use, or collection of like-uses, that is signed by the manager and the Regional Chief of Refuges in the respective Service region. Draft compatibility determinations applicable to uses described in this draft CCP and EIS are included in Appendix D.

1.4.7.2 Biological Integrity, Diversity, and Environmental Health Policy

The Service is directed in the Refuge Improvement Act to "ensure that the biological integrity, diversity, and environmental health of the Refuge System are maintained for the benefit of present

and future generations of Americans…" The biological integrity policy helps define and clarify this directive by providing guidance on what conditions constitute biological integrity, diversity, and environmental health; guidelines for maintaining existing levels; guidelines for determining how and when it is appropriate to restore lost elements; and guidelines in dealing with external threats to biological integrity, diversity and health.

1.4.8 Wilderness Review

As part of the CCP process, we reviewed the lands within the boundaries of Driftless Area NWR for wilderness suitability. No lands were found suitable for designation as Wilderness as defined in the Wilderness Act of 1964. The Refuge does not contain 5,000 contiguous roadless acres, nor does the Refuge have any units of sufficient size to make their preservation practicable as Wilderness.

1.4.9 Cultural Resources

The National Wildlife Refuge System Improvement Act of 1997 requires consideration of archeological and cultural values as part of the planning for each Refuge. A cultural resources management overview and plan was conducted and completed in November 2002 (Commonwealth Cultural Resources Group, Inc.) under contract with the U.S. Fish and Wildlife Service. The overview included counties with existing Refuge lands and counties with potential acquisition areas. They reviewed lands in Allamakee, Clayton, Delaware, Dubuque, Fayette, and Jackson counties, Iowa and Grant County, Wisconsin. Two historic archeological sites were identified on the Refuge. The location of 27 previously identified archaeological sites within one mile of the study units and statistical analysis of other data indicates a high probability for unrecorded sites on the Refuge.

1.5 Other Conservation Initiatives

1.5.1 Upper Mississippi River/Tallgrass Prairie Ecosystem

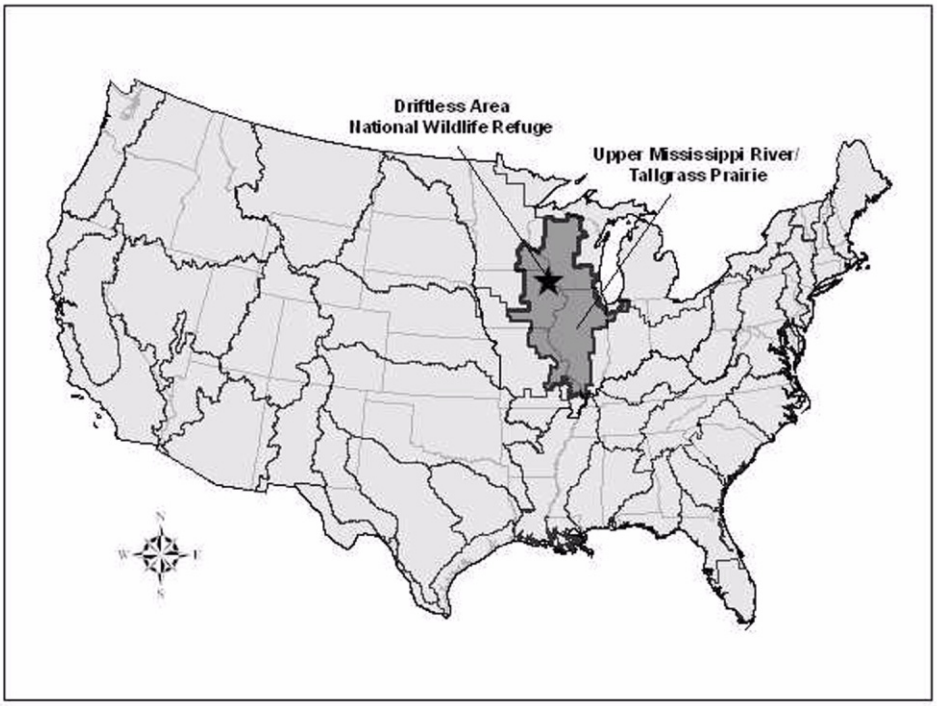
The U.S. Fish and Wildlife Service has implemented an ecosystem approach to fish and wildlife conservation. Under this approach the Service's goal is to contribute to the effective conservation of natural biological diversity through perpetuation of dynamic, healthy ecosystems by using an interdisciplinary, coordinated strategy to integrate the expertise and resources of all stakeholders.

Driftless Area NWR lies within the Upper Mississippi River/Tallgrass Prairie Ecosystem (Figure 2). The Upper Mississippi River/Tallgrass Prairie Ecosystem is one of eight ecosystems that comprise the Great Lakes-Big Rivers Region (Region 3) of the U.S. Fish and Wildlife Service. The Upper Mississippi River/Tallgrass Prairie Ecosystem is a large and ecologically diverse area that encompasses land in the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The Mississippi River bisects the Ecosystem east and west. Major rivers in the Ecosystem include the Minnesota, Chippewa, Black, Wisconsin, Iowa, Rock, Skunk, Des Moines, Illinois, and Kaskaskia (Figure 3).

1.5.2 Migratory Bird Conservation Initiatives

U.S. Fish and Wildlife Service and other conservation plan priorities for migratory birds, such as Partners in Flight, are used to develop management guidelines for birds. The Refuge is within the Upper Great Lakes Plain physiographic area 16 as identified by the Partners in Flight Bird

Figure 2: Upper Mississippi River/Tallgrass Prairie Ecosystem



Conservation Plan (Knutson et al. 2001) and Bird Conservation Region 23 (Prairie Hardwoods Transition) identified by the North American Bird Conservation Initiative (Figure 4).

Iowa, Minnesota, Wisconsin, and Illinois are currently writing state wildlife conservation plans. Wisconsin has a Bird Conservation Plan, and Minnesota is working towards one. The Refuge will incorporate elements of these plans into management when possible.

1.5.3 Region 3 Fish and Wildlife Resource Conservation Priorities

The Government Performance and Results Act (GPRA) required the U.S. Fish and Wildlife Service to identify its most important functions and to direct its limited fiscal resources toward those functions. From 1997 to 1999 within Region 3, a group looked at how best to identify the most important functions of the Service within the region. The group recognized that the Service has a complex array of responsibilities specified by treaties, laws, executive orders, and judicial opinions that dwarf the agency's budget. The group recognized that at least two approaches are possible in identifying conservation priorities – habitats and species. The group chose to focus on species because 1) species represent biological and genetic resources that cannot be replaced; 2) a focus on species conservation requires a concurrent focus on habitat; and 3) by focusing on species assemblages and identifying areas where ecological needs come together the Service can select the few key places where limited efforts will have the greatest impact. Representatives of the migratory bird, endangered species, and fisheries programs in Region 3 identified the species that require the utmost attention given our current level of knowledge. Representatives prioritized the species based on biological status (endangered or threatened, for example), rare or declining levels, recreational or economic value, or "nuisance" level. The group pointed out that species not on the prioritized list are important too. But, when faced with the needs of several species, the Service should emphasize the

Figure 3: Watershed Surrounding Driftless Area NWR

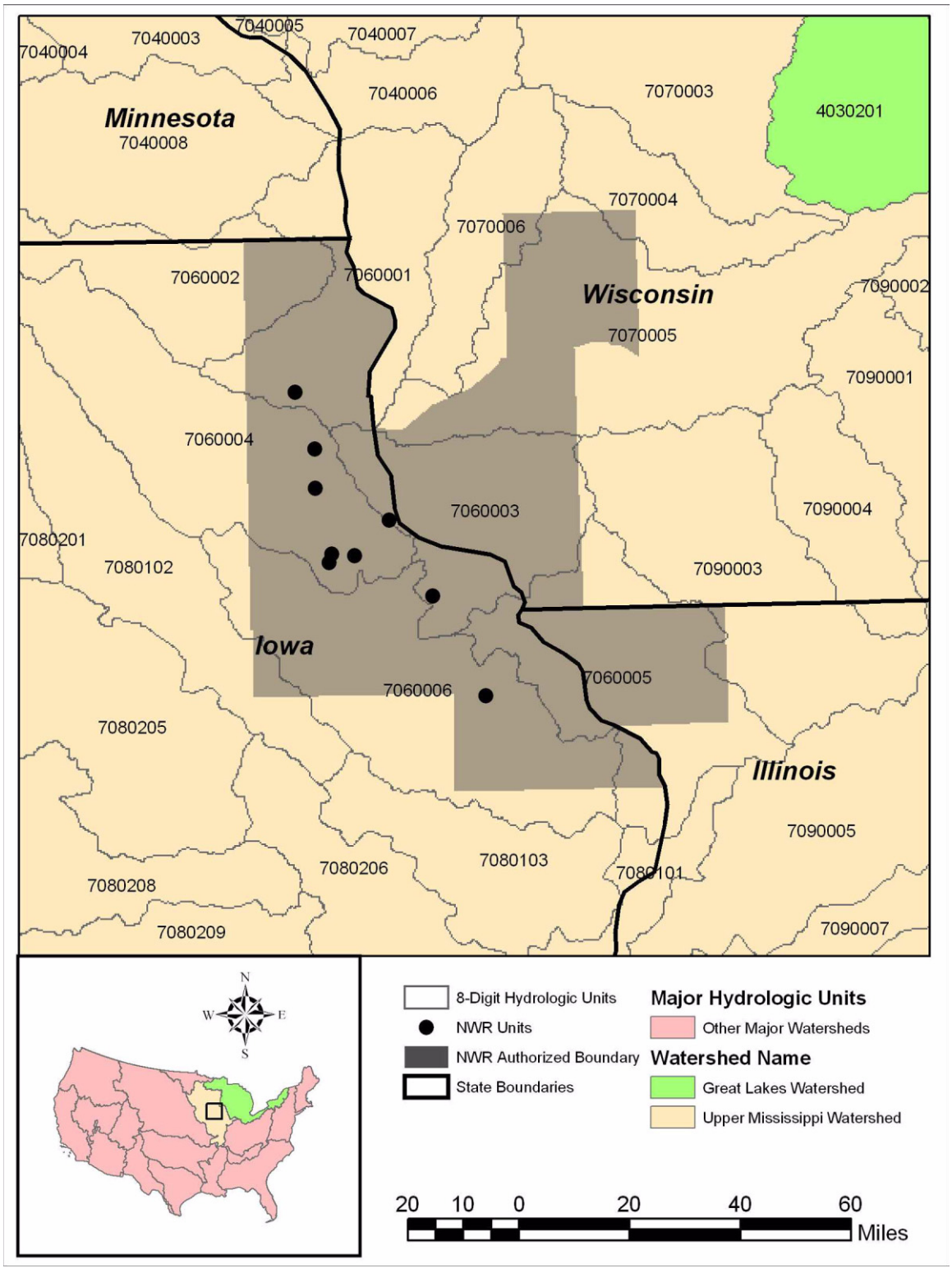
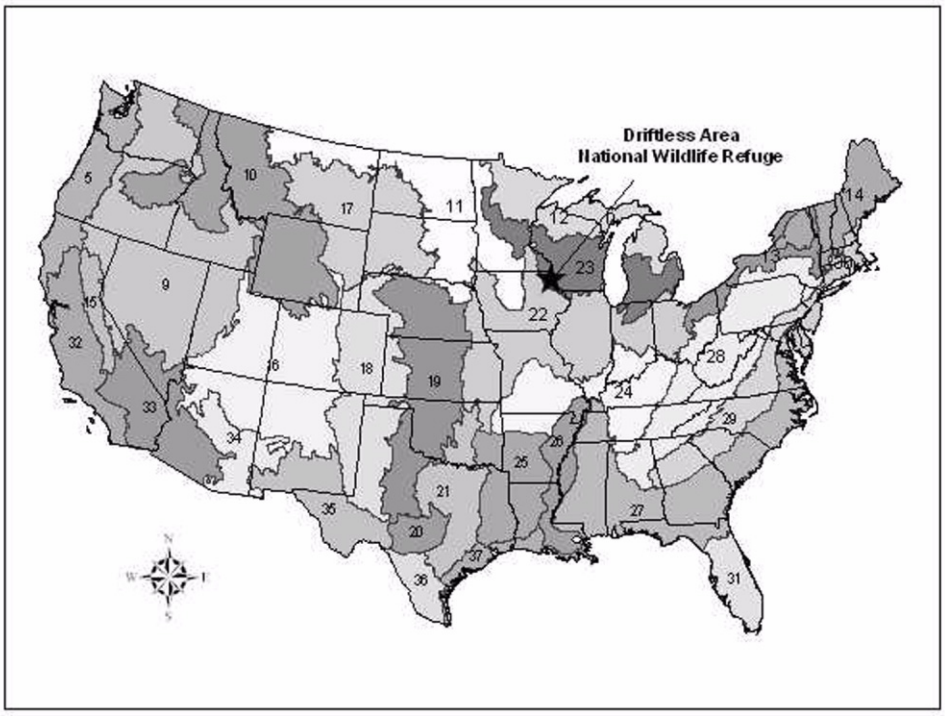


Figure 4: Bird Conservation Regions, Region 3 of the USFWS



species on the priority list. The Iowa Pleistocene snail, Northern monkshood, Leedy's roseroot, and glacial relict snails are among the Regional Resource Conservation Priorities.

1.5.4 Other Plans

The Nature Conservancy (TNC) completed a Prairie-Forest Border Ecoregion Plan in 2001. The Iowa Pleistocene snail, other glacial relict snails, Northern monkshood, and threatened Leedy's roseroot were identified as conservation targets in that plan. Algific talus slopes were identified as ecologically important areas by The Nature Conservancy. The Nature Conservancy Plan also identified Important Bird Breeding Areas in northeast Iowa that include potential Refuge acquisition areas. Elements of The Nature Conservancy Plan, primarily for land protection, are related to habitat management for the Refuge.

1.6 Brief History of Refuge Establishment, Acquisition, and Management

1.6.1 Refuge Establishment and Acquisition

The Driftless Area NWR was established in 1989 under the authority of the Endangered Species Act of 1973 for the protection and recovery of the federally threatened Northern monkshood and endangered Iowa Pleistocene snail. The Refuge currently consists of nine units in Allamakee, Clayton, Dubuque, and Jackson Counties in northeast Iowa (Figure 5). The Refuge encompasses 781 acres, with individual units ranging from 6 to 209 acres (Table 1). The original authorized acquisition area for the Refuge was approximately 700 acres in eight counties in Iowa, Illinois, and Wisconsin

(Figure 1) (U.S. Fish and Wildlife Service 1986). Section 1.4.2 has additional background information on Refuge acquisition planning. The most recent acquisitions were through land exchanges in 2001 and 2002. The Refuge has reached its approved acquisition acreage.

The purposes and goals of the Refuge are directly tied to recovery plans which describe the steps needed to recover and conserve the Northern monkshood and Iowa Pleistocene snail (U.S. Fish and Wildlife Service 1983, 1984). Because of the fragile nature of their habitat and the low number of populations for each of these species, the primary recovery goal for both species is protecting and conserving the majority of remaining populations and their habitat. The primary threats to the habitat are grazing, logging, sinkhole filling, erosion, pesticides, invasive species, and development. Therefore, acquisition also includes land surrounding the endangered species habitat to provide a buffer area from some of these threats.

1.6.2 Management History

A management prospectus was completed by the Refuge in 1990 (U.S. Fish and Wildlife Service) to guide Refuge management. At that time, the Refuge consisted of the Howard Creek (208 acres) and Steeles Branch (15 acres) units. The prospectus outlined the need for strict protection of the algific slopes including fencing and signing, a low public use profile, and no development of public use facilities. Buffer areas to protect sinkholes, and cleaning of debris from sinkholes were also mentioned. Management of habitat surrounding algific slopes was to be through natural succession or planting, depending on the site. Most habitat management has occurred on the Howard Creek unit. Two former agricultural fields (51 acres) at the Howard Creek unit were planted with cool season grasses after cooperative farming ended around 1992. Over the years, box elder trees invaded these fields. Box elder trees and other invasive species were controlled with cooperative farming beginning in 1999 and 51 acres have been recently planted to native prairie grasses and forbs. Restoration and management of invasive species at this site are ongoing. Management on the other units has consisted of signing, fencing, law enforcement, and maintaining good relationships with the Refuge neighbors. The Howard Creek and Fern Ridge units were opened for public use in 1994 (see section 1.6.3.5). Northern monkshood population monitoring began in 1991 and Iowa Pleistocene snail population monitoring in 2001. Monitoring occurs on Refuge and sites owned by others.

1.6.3 Current Refuge Management Activities

The Refuge consists of nine scattered tracts or 'units' totaling 781 acres (Table 1, Figure 5). The Refuge contains upland hardwood forests, grassland, stream and riparian habitats. The landcover for each unit is displayed in the following figures:

- Bankston Unit (Figure 6)
- Cow Branch Unit (Figure 7)
- Fern Ridge Unit (Figure 8)
- Hickory Creek Unit (Figure 9)
- Howard Creek Unit (Figure 10)
- Kline Hunt Hollow Unit (Figure 11)
- Lytle Creek Unit (Figure 12)
- Pine Creek Unit (Figure 13)
- Steeles Branch Unit (Figure 14)

The current management practice is to protect endangered species habitat, restore other habitats to presettlement vegetation when possible, control invasive species, and permit limited public use that is compatible with the purposes of the Refuge. Presentations and tours are given as requested and staff time allows. The Refuge office is co-located with the McGregor District of Upper Mississippi

Figure 5: Location of Driftless Area NWR in Iowa

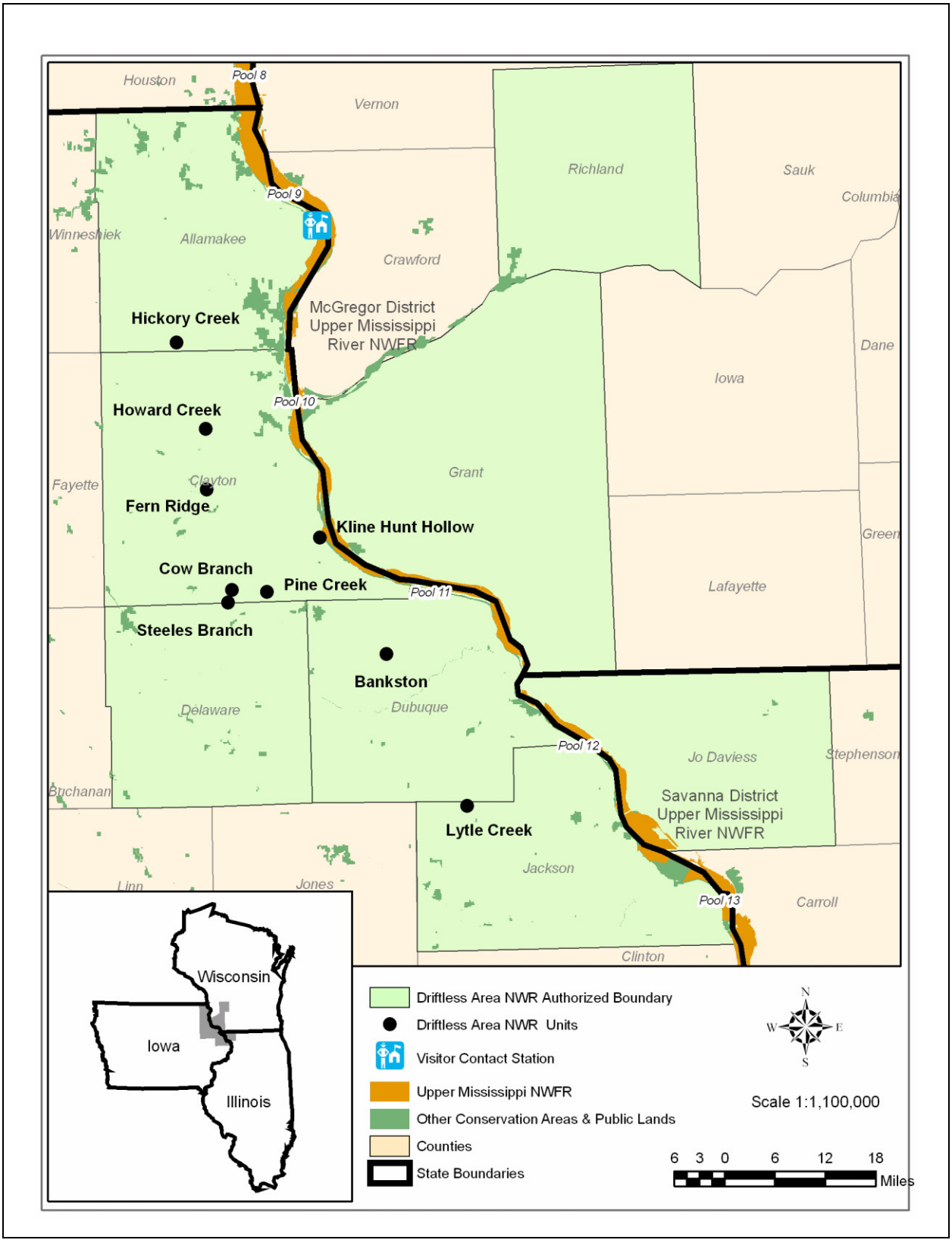


Table 1: Driftless Area NWR Units in Iowa (2004)

Unit Name	Acres	County	Year Acquired	Species present
Bankston	57	Dubuque	1991	Iowa Pleistocene snail
Cow Branch	110	Clayton	1996	Iowa Pleistocene snail Northern monkshood
Fern Ridge	207	Clayton	1991	Iowa Pleistocene snail
Hickory Creek	17	Allamakee	2001	Northern monkshood
Howard Creek	209	Clayton	1989/1990	Iowa Pleistocene snail Northern monkshood
Kline Hunt Hollow	6	Clayton	1991	Northern monkshood
Lytle Creek	20	Jackson	1991	Northern monkshood
Pine Creek	140	Clayton	2002	Northern monkshood
Steeles Branch	15	Clayton	1990	Northern monkshood

River NWFR. An equipment storage warehouse and information kiosk were constructed in 2004 on the Howard Creek unit of the Refuge. Boundary fences and dirt surfaced roads are the only other constructed developments on the Refuge. One full time Refuge Operations Specialist is assigned to the Refuge and supervised by the District Manager, McGregor District, Upper Mississippi River NWFR.

Partners have been important players in Refuge activities over the years. The Nature Conservancy helped establish the Refuge and has worked extensively with the Refuge since then. TNC owns several preserves on which algific talus slopes occur and works to preserve the biodiversity of the Driftless Area. They have conducted algific slope inventory and research, contacted landowners, provided summer interns, and worked on acquisitions in a cooperative effort to protect the unique resources of the area. The Iowa Natural Heritage Foundation has also been a valuable partner in landowner contacts and land acquisition. Other agencies and individuals have assisted with prairie restoration at the Howard Creek unit. The Iowa DNR also owns preserves that protect algific talus slopes and federally listed species and has been an important partner in land protection and management.

1.6.3.1 Endangered Species

The primary goal of Refuge management for endangered species is preventing disturbance to their habitat. Endangered species habitat is closed to all public entry because the species and their habitat are fragile. Algific slopes are typically steep, with a loose talus rock layer on the surface. Seven of the nine Refuge units are closed to all public entry because there is inadequate buffer around the algific talus slopes to allow human activity and there is not sufficient public access. Entry to several units is via an easement granted across private land. The two largest units, Howard Creek and Fern Ridge, are open to hunting, fishing, and wildlife observation. These units lie adjacent to public roads from which there is public access. The algific talus slopes are posted as closed to public entry on these open units. All units are periodically inspected by Refuge staff and law enforcement officers.

Most of the Refuge units are fenced to keep cattle from entering Refuge lands and to delineate boundaries. Refuge personnel maintain regular contact with neighboring landowners.

The invasive species, garlic mustard (*Alliaria petiolata*) has invaded some algific slopes. There is concern about its competition with Northern monkshood and other rare plants as well as possible

Figure 6: Bankston Unit Landcover, Driftless Area NWR

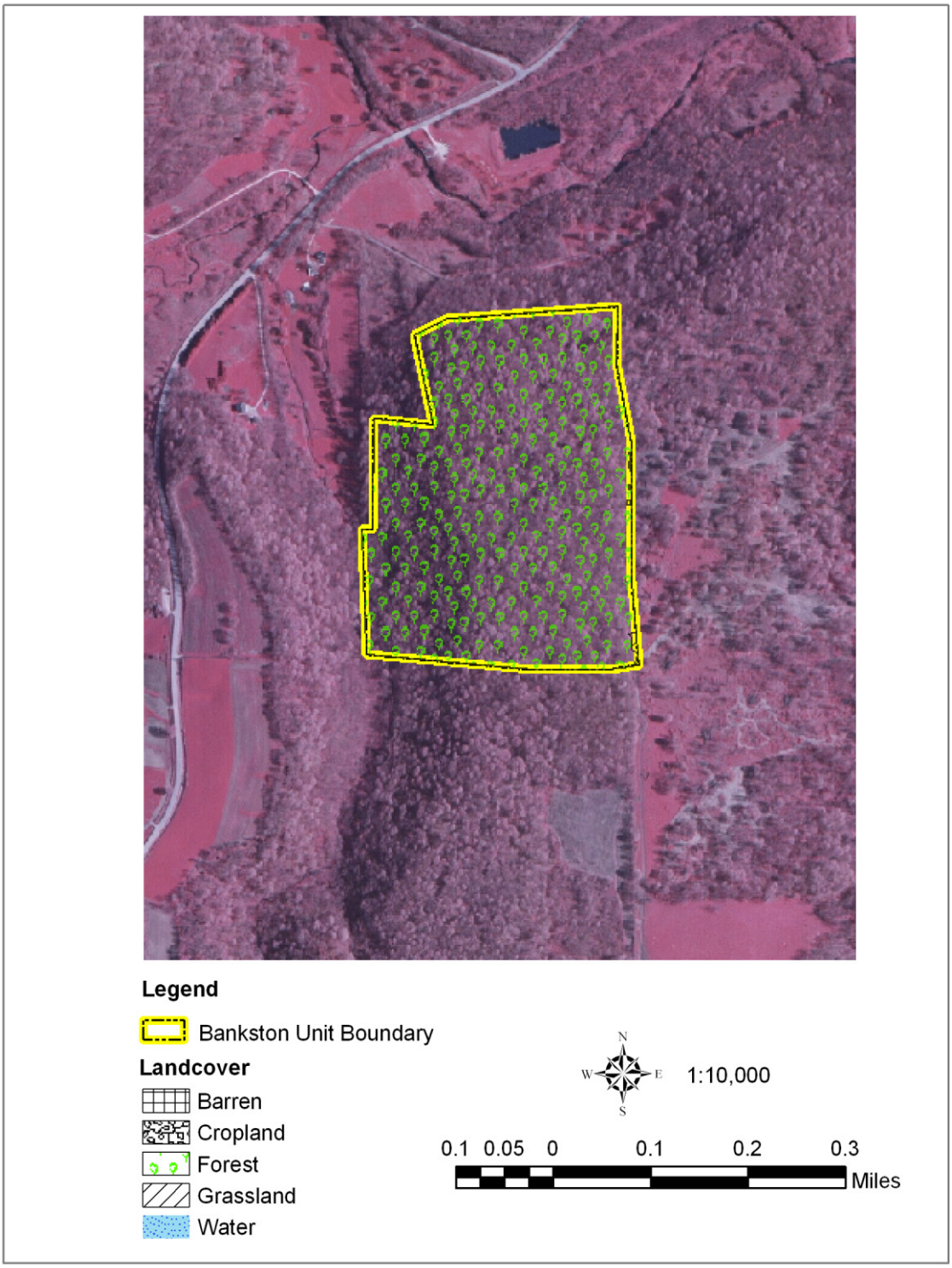


Figure 7: Cow Branch Unit Landcover, Driftless Area NWR

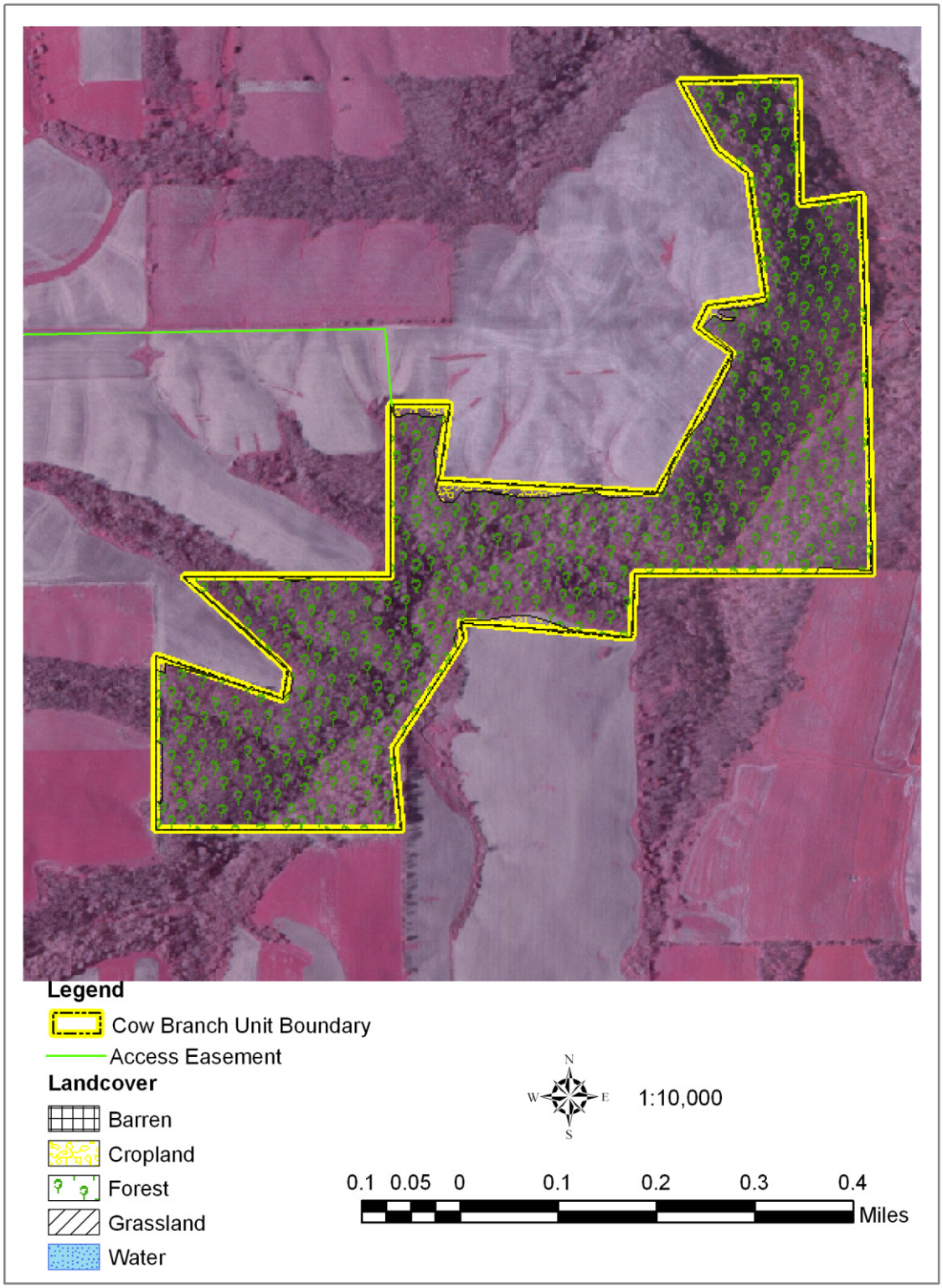


Figure 8: Fern Ridge Unit Landcover, Driftless Area NWR

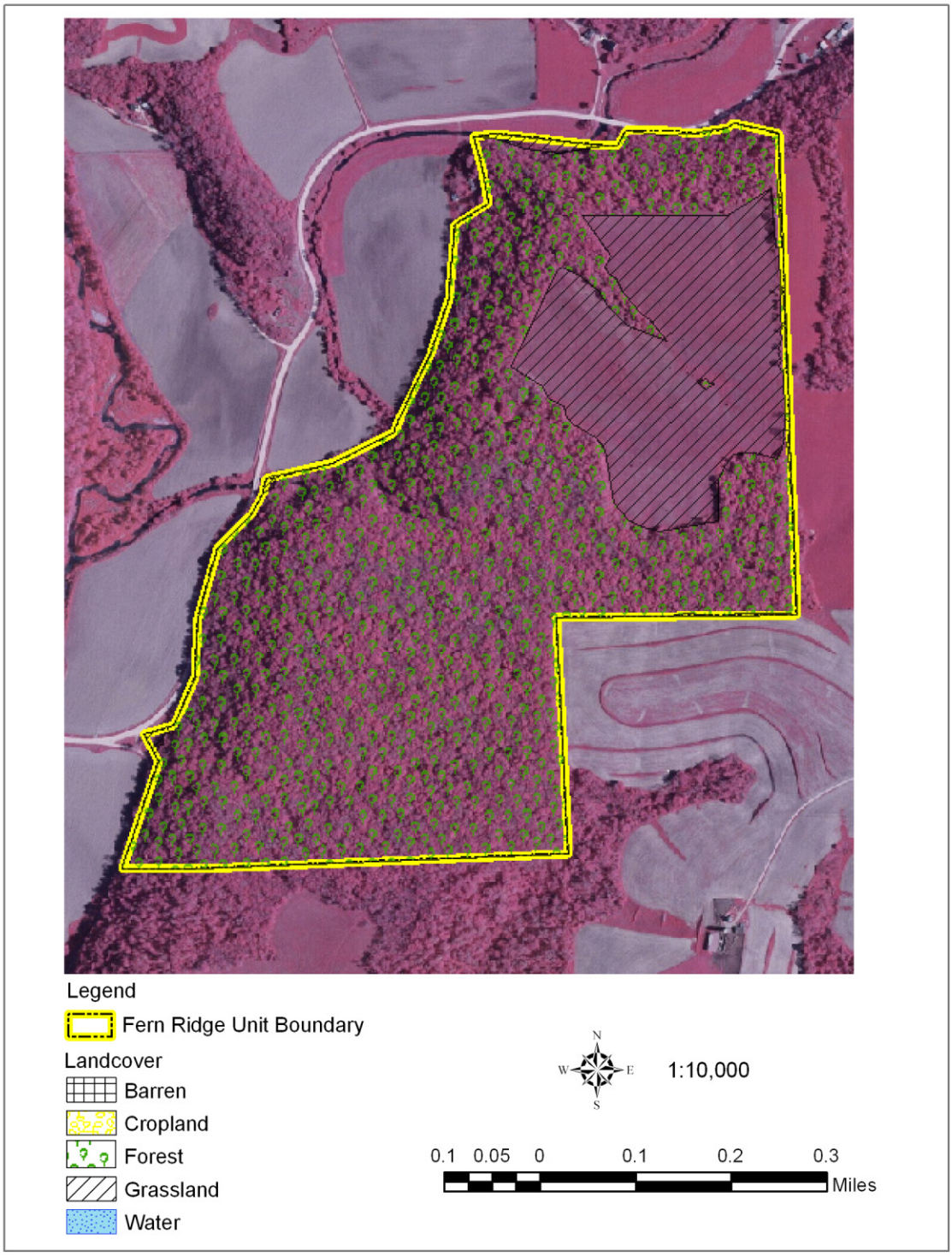


Figure 9: Hickory Creek Unit Landcover, Driftless Area NWR

Figure 10: Howard Creek Unit Landcover, Driftless Area NWR

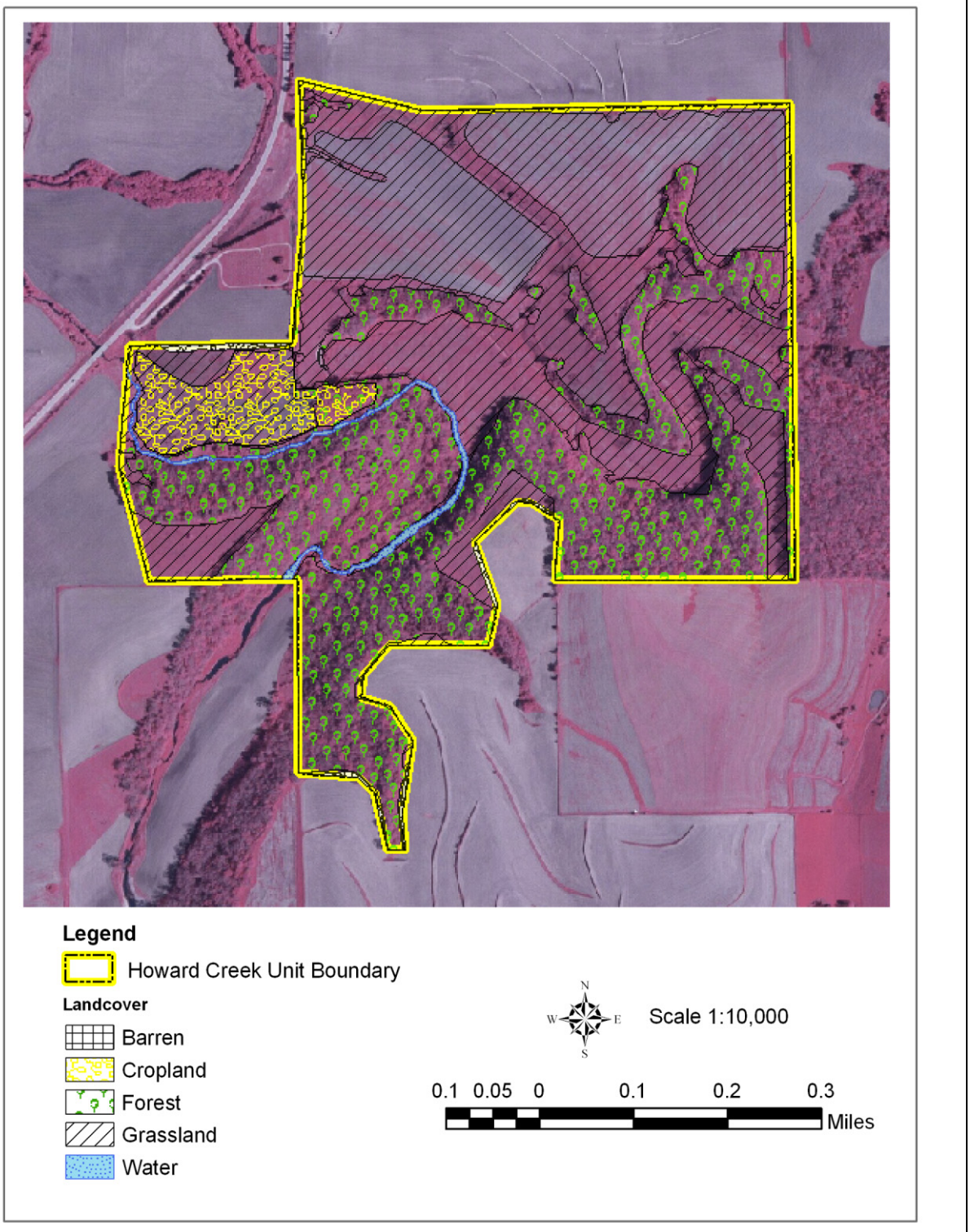


Figure 11: Kline Hunt Hollow Unit Landcover, Driftless Area NWR

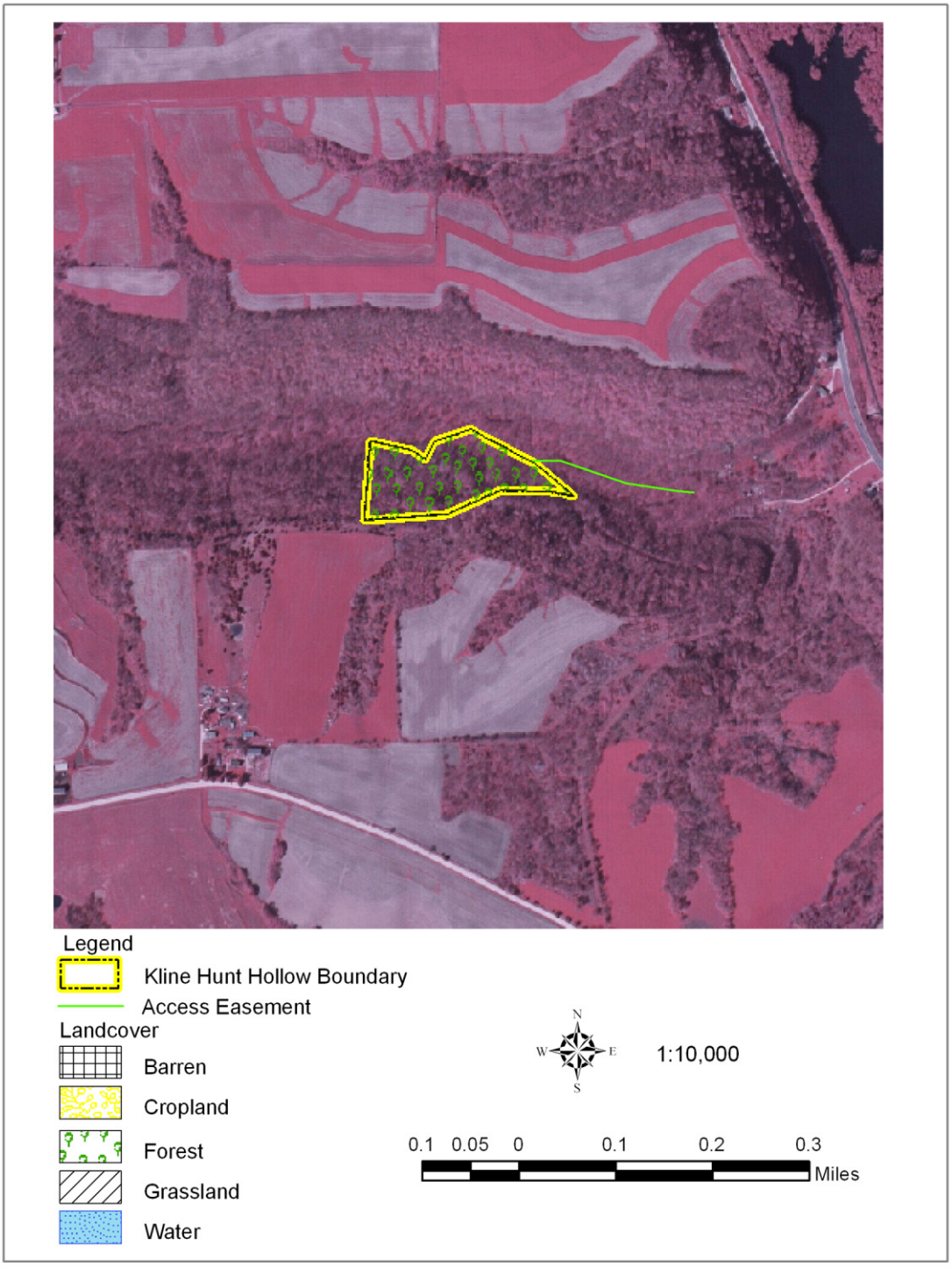


Figure 12: Lytle Creek Unit Landcover, Driftless Area NWR

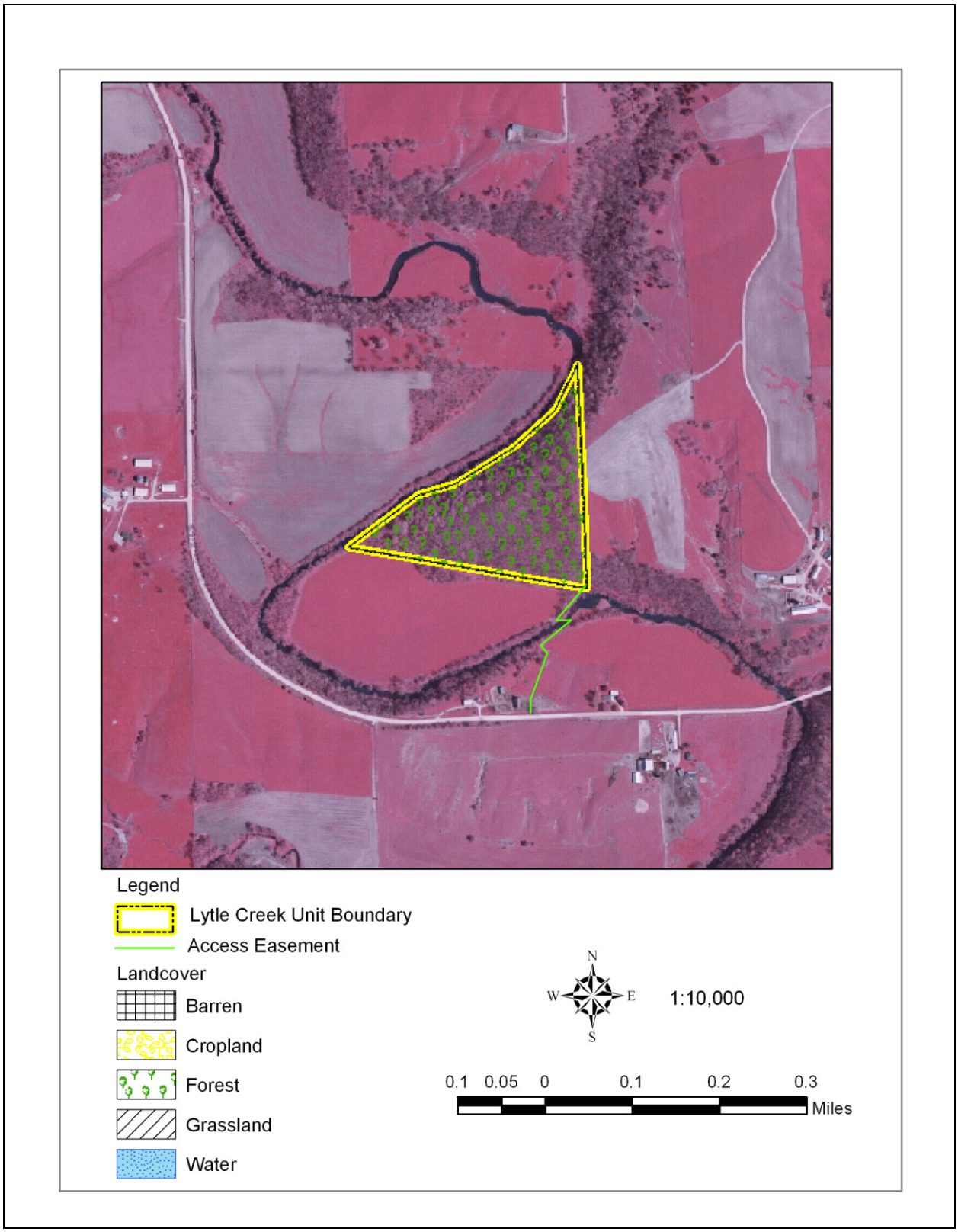


Figure 13: Pine Creek Unit Landcover, Driftless Area NWR

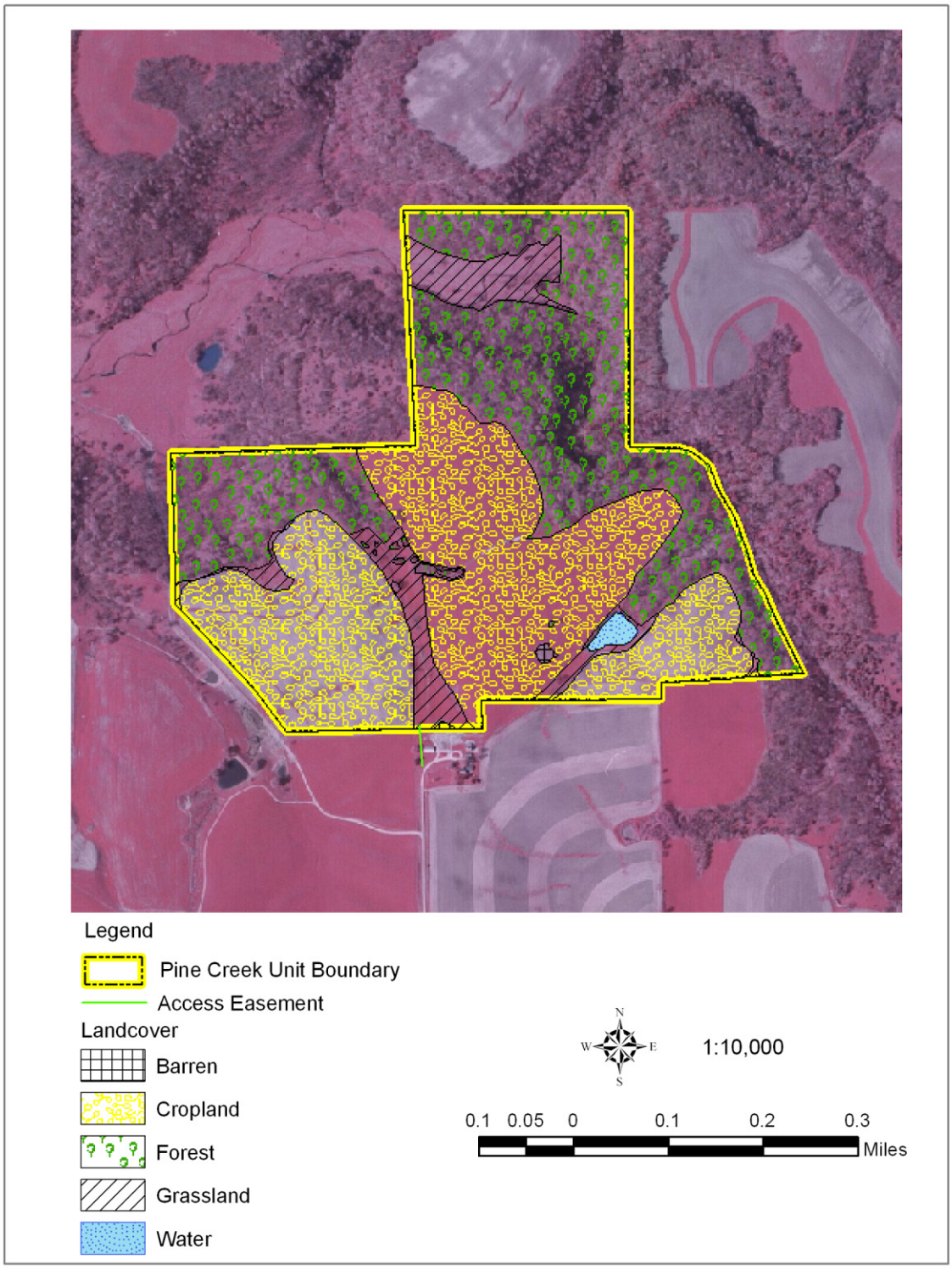
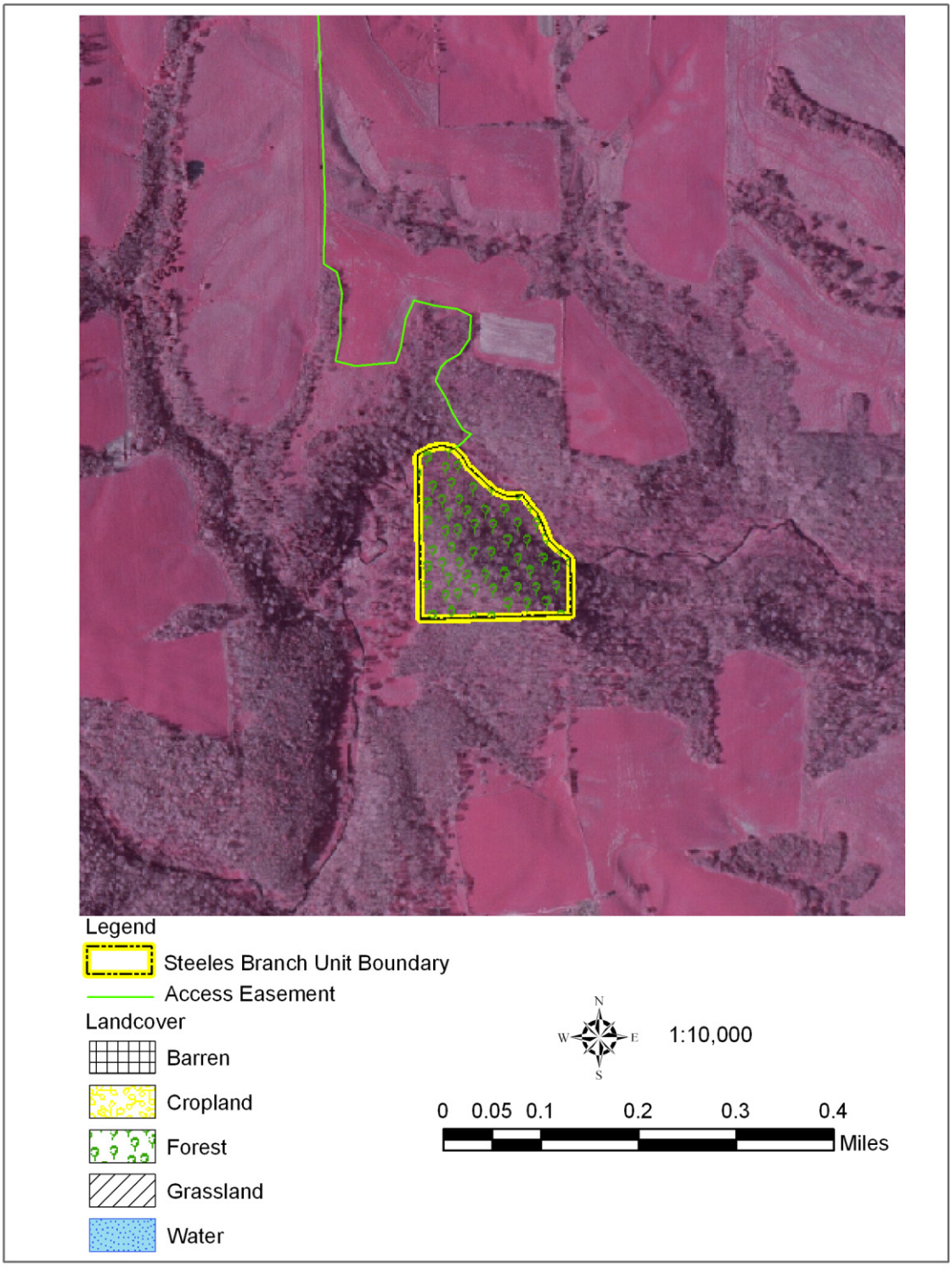


Figure 14: Steeles Branch Unit Landcover, Driftless Area NWR



effects on snail food sources. Garlic mustard is abundant on two slopes and has been hand removed from them during the last three years to begin control. Removal will likely be a continual effort until the seed bank is depleted. The forest surrounding these algific slopes also has abundant garlic mustard.

The recovery plans for both species require population monitoring to determine population status. A monitoring plan for Northern monkshood was developed cooperatively with the Iowa Department of Natural Resources and TNC in 1991. This monitoring has been conducted on Refuge sites as well as Iowa Department of Natural Resources preserves, The Nature Conservancy preserves, and private lands since 1991. A protocol for Iowa Pleistocene snail monitoring was developed in 2001 (Henry et al. 2003) and has been carried out each year since. Monitoring for both species occurs on a subset of the total number of known sites.

Refuge staff maintain contact with private landowners who have endangered species on their land in order to educate them about the fragile area on their land and inquire about possible acquisition or other forms of permanent protection. Some sites have been fenced through the Service's Endangered Species Landowner Incentive Program to prevent damage from cattle. The Nature Conservancy, Iowa DNR, and the Iowa Natural Heritage Foundation have been partners in landowner contact and land acquisition. The Refuge recently acquired Hickory Creek and Pine Creek units through land trades involving Upper Mississippi River NWFR lands. But, acquisition is currently limited by available funds and the need for additional Service authorization for Refuge expansion.

1.6.3.2 Grassland Habitat

There are 175.6 acres of grassland on the Refuge. The majority of grassland habitat exists on the Howard Creek unit (109.93 acres) and the Fern Ridge Unit (42.22 acres) (Figure 10 and Figure 8). Remnant native prairie exists on the Howard Creek unit (approximately 6 acres). The remainder of the grassland on Howard Creek unit is either cool season grasses or has been recently planted to native prairie species. The grassland on the Fern Ridge unit was cleared of trees by the previous owner for agriculture and is currently vegetated by cool season exotic grasses.

Prescribed burning has been used since 1996 to restore prairie remnants and control woody vegetation on the Howard Creek unit. Forty-eight acres of native prairie have been planted in former agricultural fields on the Howard Creek Unit. Cooperative farming has been used to prepare fields for planting. Currently, there are 81 acres in the cooperative farming program, primarily at the Pine Creek Unit. Invasive species control has taken place as staff time allows through the use of biological, mechanical and chemical control, mainly at the Howard Creek unit.

1.6.3.3 Forest Habitat

There are 535.32 acres of forest habitat on the Refuge. The majority of Refuge forests have been impacted by past grazing and logging. No restoration of forest habitats has been completed; however, tree seeds were collected in 2003 and sent to a nursery to grow trees for planting on the Refuge. Forest inventory and management plans are needed.

1.6.3.4 Streams

Cow Branch, Fern Ridge, Howard Creek, Pine Creek, and Steeles Branch units contain coldwater or warmwater streams with associated riparian areas. Lytle Creek, Hickory Creek, and Kline Hunt Hollow units have streams adjacent to the boundary. Spring fed streams on Pine Creek and Cow Branch units flow into designated trout streams off of the Refuge. Hickory Creek is a designated trout stream stocked with brown and brook trout by the Iowa DNR. Dry Mill Creek on the Fern Ridge unit is a put and grow trout stream that flows into the Turkey River. Steeles Branch creek was formerly stocked by the Iowa DNR but is no longer. Springs on the Refuge feed most of these

streams. The Pine Creek unit also has a small manmade pond about one acre in size. Bankston unit does not contain any streams.

1.6.3.5 Recreation

Currently, the Howard Creek and Fern Ridge units of the Refuge are open for deer and upland game hunting. Special regulations regarding hunting dates and weapons are in place. Specifically, deer hunting is allowed only with archery and muzzleloader. Hunting dates are restricted to November 1 to January 15. Upland game hunting is allowed with approved non toxic shot. Spring turkey hunting is prohibited. These two units are also open for wildlife observation and photography. Fern Ridge and Steeles Branch units are open for fishing. All algific slopes are posted closed areas with no public entry. There are no public use trails. Educational programs and tours are occasionally given as requested by local groups or photographers.

Volunteers have assisted with habitat restoration at the Howard Creek unit. The Nature Conservancy has provided a summer intern for several years to work at the Refuge. Interns have assisted with endangered species monitoring, landowner contacts, invasive species removal, and other Refuge and TNC activities.

1.6.3.6 Cultural Resources

Reviews for threats to cultural resources on Refuge units are currently completed and submitted to the Regional Historic Preservation Officer as management activities arise. Recent examples of management activities include stabilizing a stream bank, building a warehouse, and burying debris from tree clearing.

1.7 Refuge Purposes

The purpose of Driftless Area NWR is to conserve fish or wildlife which are listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973). The purposes and goals of the Refuge are directly tied to recovery plans which describe the conditions needed to recover the Northern monkshood and Iowa Pleistocene snail (U.S. Fish and Wildlife Service 1983, 1984). See Section 1.4.1.

1.8 Refuge Vision Statement

The vision for the Upper Mississippi River NWR Complex is: The Complex is beautiful, healthy, and supports abundant and diverse native fish, wildlife, and plants for the enjoyment and thoughtful use of current and future generations. This can be stepped down to apply to Driftless Area NWR as follows: The Refuge is beautiful, healthy, and supports and conserves native and rare wildlife and plants for current and future generations.

1.9 Refuge Goals

The goals for Refuge management were formulated from major issues identified by staff and the public.

1.9.1 Habitat Goal

Conserve endangered species habitat and contribute migratory bird and other wildlife habitat within a larger landscape.

1.9.2 Species Management Goal

Manage and conserve endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

1.9.3 Visitor Services Goal

Visitors understand and appreciate the role of the Refuge in conserving endangered species.

1.10 Planning Issues

Four public scoping meetings were held in August and September, 2002 to obtain input on issues. The meetings were held in Dubuque, Elkader, and Lansing, Iowa, and Prairie du Chien, Wisconsin in combination with the Upper Mississippi River NWFR meetings. Eighty-four citizens attended and 21 comments were received. One additional written comment was received after the meetings. An evening "Manager for a Day" workshop was held in Elkader, Iowa in Spring 2003 to obtain potential solutions to the issues. There were 15 participants at the workshop. Four mailings of a CCP newsletter have been sent to a mailing list of 2,800 people including individuals, landowners, organizations, media, and congressional staff ("Appendix H:" on page 155).

From public involvement activities, the Service learned about issues that concerned people about management of the Refuge. Refuge staff also identified issues. We organized the issues into four categories: Habitat Management, Visitor Services, Refuge Expansion, and Species Assessments.

1.10.1 Issue 1: Habitat Management

Because of the purpose of the Refuge, management of endangered species habitat is the top priority. Land acquired for the Refuge typically has been impacted by agricultural or logging activities. Habitats include hardwood forest, grassland and riparian areas. Refuge lands are small parcels, often fragmented from similar habitat in the area. Current management is to restore as much as practical to presettlement habitat types around algific slopes, although lack of funds and staff limit restoration efforts. Several external factors are influencing management efforts on the Refuge. Invasive species such as garlic mustard are impacting endangered species and other wildlife habitat. High local deer populations may also impact habitat. Erosion from farming adjacent to the Refuge can affect habitat on the Refuge.

Potential solutions identified by the public were to develop management strategies for forests, including consideration of deer impacts, expand management of habitats surrounding endangered species habitat, and work to control invasive species.

1.10.2 Issue 2: Visitor Services

Public use has not been emphasized on Driftless Area NWR because of concern for the fragile endangered species habitat, and the small size and lack of access to some units. Two of nine units are currently open to public use. Potential solutions suggested by the public were to maintain current hunting policies but increase awareness of regulations at the site, consider trail development in less sensitive areas, provide on-site information and education at select algific slopes while restricting direct access and negative impacts, provide guided walks, and encourage volunteers.

1.10.3 Issue 3: Refuge Expansion

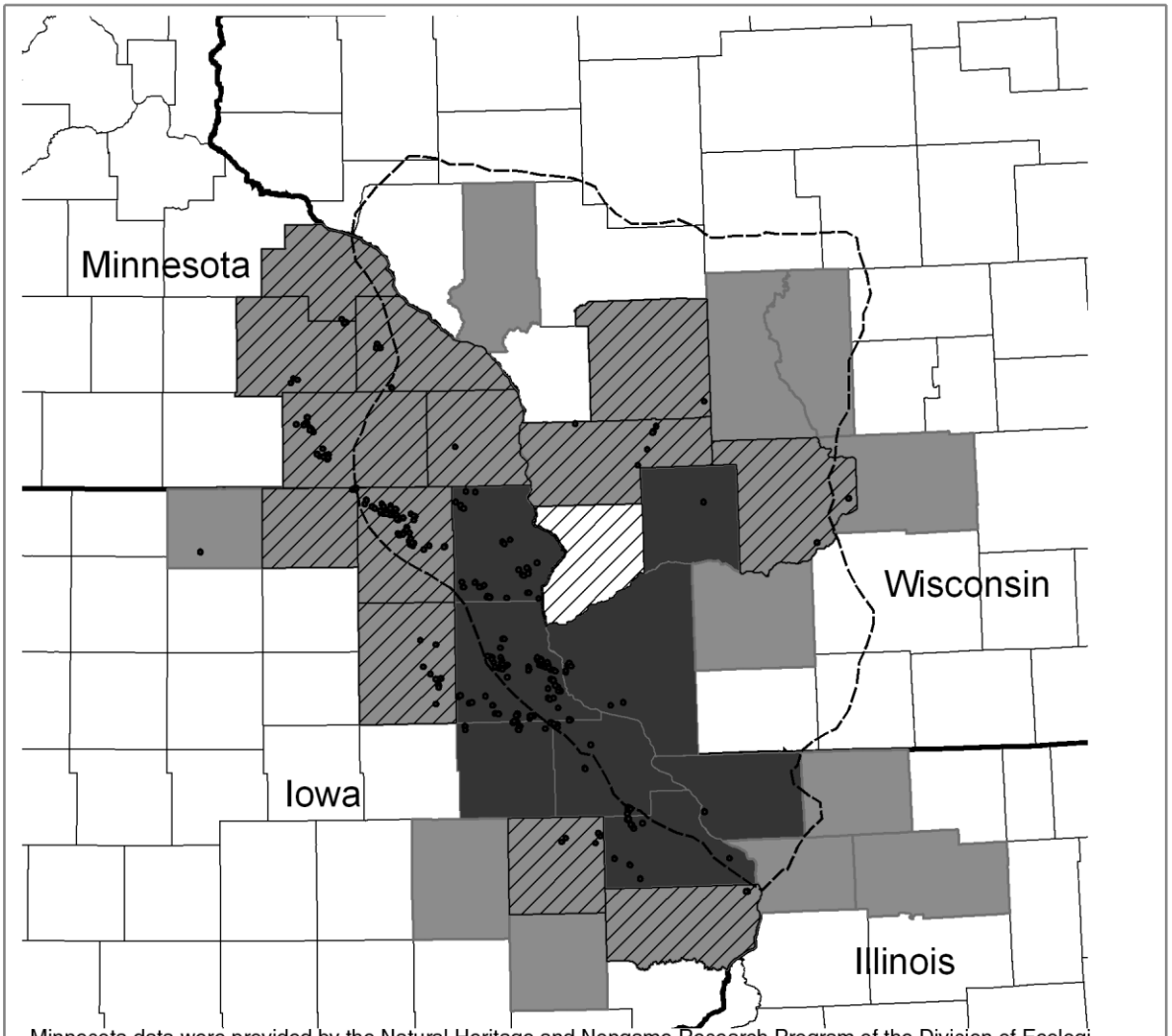
The Refuge has reached its approved acquisition acreage. Refuge expansion will facilitate recovery goals and allow delisting of target species according to their recovery plans. Refuge land acquisition is aimed at protecting the entire algific slope system (endangered species habitat), including upland sinkholes and buffer area around the slope. Many of the currently protected algific slopes do not have adequate protection of sinkholes nor provide buffer from adjacent agricultural or other uses. Conservation of additional snail and monkshood populations is also needed to preserve genetic diversity over their range, protect large populations, and protect the majority of the populations as required by the recovery plans. Therefore expansion in Wisconsin is needed. Expansion in Minnesota would also allow protection of threatened Leedy's roseroot and species of concern. Protection of Service species of concern may preclude the need for future listing and would conserve a unique representative natural community and its biodiversity.

Potential approaches raised by the public were: to investigate other alternatives in addition to acquisition (e.g. conservation easements), increase funding for land protection, connect parcels of land where possible and expand boundaries to roads, railroads, or more recognizable features.

1.10.4 Issue 4: Species Assessments

Algific slopes were first described and mapped in the 1980s (Frest 1982, 1983, 1985, 1986, 1987). Additional information about algific talus slopes and the species that inhabit them is needed. For example, locations of sinkholes and specific information on distances and function of the cold air flow have not been studied. There are nearly 400 algific slopes/maderate cliffs in the Driftless Area, but not all are occupied by currently listed species (Figure 15). Few in-depth species surveys were done and many of the known algific slope sites were only visited once. There may be rare, endemic, or unidentified species in this habitat. It is important to know what plants and animals depend on this habitat to prepare effective management strategies. Although original surveys to locate this habitat type were systematic and comprehensive, some sites likely remain undiscovered.

Figure 15: Algific Slopes Species Occurrences in the Driftless Area



Minnesota data were provided by the Natural Heritage and Nongame Research Program of the Division of Ecological Services, Minnesota Department of Natural Resources, and were current as of January 2004. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. In addition, there may be inaccuracies in the data, of which the DNR is not aware and for which the DNR shall not be held responsible. Permission to use these data does not imply endorsement or approval by the DNR of any interpretations or products derived from the data.

Legend

The Driftless Area

Target Species Occurrences/Potential Acquisition Sites

2004 Proposed Expansion

1993 Proposed Expansion (PPP)

Original Acquisition Boundary

1:3,000,000

N W E S

30 15 0 30 60 90

Miles

Chapter 2: Alternatives, Objectives, and Strategies

2.1 Introduction

This chapter describes the three alternatives that we consider in this Environmental Impact Statement:

Alternative A – No Action Alternative
Alternative B – Habitat Protection Emphasis
Alternative C – Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation

Prothonotary Warbler. USFWS

2.2 Formulation of Alternatives

The Service constructed a range of alternatives from ideas provided by the public and Refuge staff. Many of the ideas were identified at a "Manager for a Day Workshop" open to the public.

Some alternatives were eliminated from detailed study. The alternatives eliminated are identified below with an explanation of why they were not considered further.

2.3 Alternatives Eliminated from Detailed Study

2.3.1 "Care-taker" Status

Refuge staff, funding, and management activities would be reduced to a level whereby the only Fish and Wildlife Service presence would be land ownership.

This alternative is not consistent with the Refuge purposes nor intent of the Endangered Species Act. Endangered species habitat could not be fully protected under this alternative. Fencing and law enforcement are needed to ensure fragile endangered species habitat is not threatened. Habitat restoration and invasive species control would not take place. The legal responsibilities associated with ownership of the Refuge would not be met. Commitments to adjacent landowners, communities, and partners would be unfulfilled.

2.3.2 Transfer lands to the Iowa DNR

Although the Iowa DNR owns state preserves with algific talus slopes and federally endangered species and has been a partner in protection, they would not have sufficient funds or personnel to manage these additional lands. The U.S. Fish and Wildlife Service has jurisdiction over federally threatened and endangered species and the Refuge was established to aid the recovery of these species. In addition, it is not within the Service's authority to dissolve units of the Refuge System. The DNR likely would not have the funding to protect enough additional areas to meet recovery goals. Furthermore, this alternative would not include acquisition needed in other states to meet recovery goals.

2.4 Summary of Alternatives

The alternatives are summarized in Table 2 on page 56. Alternative A is the no action alternative. Alternatives B and C include increased habitat conservation and land acquisition. Alternative B is primarily aimed at reaching habitat protection recovery goals for both species with more land acquisition than Alternative C. Alternative C includes increased land acquisition for recovery and delisting of the Iowa Pleistocene snail along with more active management of Refuge lands and endangered species habitat to meet multiple recovery tasks for delisting. Alternative C includes more environmental education than the other two alternatives. Endangered species habitat within Refuge units would remain closed to all public entry for all alternatives. Management of cultural resources would be the same for all alternatives with all actions referred to the regional Historic Preservation Officer. Prescribed fire would be used to some degree under all alternatives for habitat management following the existing approved Refuge fire plan (U.S. Fish and Wildlife Service 2002).

2.4.1 Alternative A – No Action

Background: Present management practices continue if this Alternative is selected. The No Action alternative is a status quo alternative where current conditions and trends continue. It also serves as the baseline to compare and contrast with the other alternatives. This alternative would be similar to current management as stated in Section 1.6.3. Acquisition efforts would not occur under this alternative because there would be no approved expanded acquisition boundary.

2.4.1.1 Habitat

Closed areas (endangered species habitat) would be maintained and inspections of Refuge units would remain at about 4 hours per week. Law enforcement patrols would remain at about 1 day per month. Forty acres of native prairie and 48 acres of forest would be planted at the Howard Creek and Fern Ridge units. Remaining forests and former agricultural fields would be left to natural succession. Invasive species would be controlled only as staff time allows. Landowner contacts for endangered species protection on private land would continue as staff time allows. The Refuge would assist partners in conserving 1000 additional acres. Endangered species monitoring would continue at current levels. Monitoring of soil/vent temperatures on algific talus slopes would continue.

2.4.1.2 Species Management

Deer populations would be evaluated and managed at a level and population structure that does not negatively impact algific slopes or associated habitats. The recovery plans for Iowa Pleistocene snail and Northern monkshood would be updated.

2.4.1.3 Visitor Services

Current public use at the Howard Creek and Fern Ridge Units would be maintained. The McGregor District Visitor Contact Station would be the primary public contact location. The current level of off-site environmental education of one to two programs per year would occur.

2.4.2 Alternative B – Habitat Protection Emphasis Alternative

Background: This alternative was formulated to place the primary focus of Refuge activities on permanent protection of endangered species habitat through land acquisition and minimal physical disturbance of endangered species habitat. Permanent protection of habitat is the primary recovery goal for these species as the habitat cannot be restored once lost. These species are also difficult to reintroduce. Algific slope habitat experts have stressed the fragility of, and need for, minimum disturbance of these sites because of the possibility of disruption of cold air flow and disturbance to rare snails and plants (U.S. Fish and Wildlife Service 1984). Protection of additional algific slopes or maderate cliffs would also meet the Service's goals of conserving biological integrity, diversity and environmental health. Refuge land protection would meet some recovery goals for these species and may prevent future listing of other land snail and plant species.

The total approved acquisition area for the Refuge would be 6,000 acres in 22 counties (four states) according to a revised Land Protection Plan (Appendix I). Expanding into additional counties will allow potential acquisition and protection of large populations, populations across the species' ranges, and protection of the majority of populations. The 3,400 acres listed in the objectives for this alternative is the acreage that we believe we can protect within the 15-year life of the CCP given anticipated levels of willing sellers, funding, and Refuge personnel. The acreage for all sites includes algific talus slopes, associated sinkholes, and buffer areas around the slopes to protect them from adjacent land uses. Protection may also be achieved in cooperation with other agencies.

Refuge activities are directly tied to recovery plans. Recovery plans for both species are outdated. The plans do not reflect current information on all known locations, monitoring data, or threats, and do not provide specific recovery goals. These plans would be updated under this alternative.

2.4.2.1 Habitat

Under this alternative, Refuge management activity on algific slopes would be limited to only occasional monitoring of endangered species. Invasive species control would occur adjacent to, but not on, endangered species habitat in order to minimize physical disturbance. Limited resources would therefore be focused on preventing further encroachment of invasive species onto algific slopes. Inspection of Refuge units would increase to 8 hours/week. Monitoring of soil/vent temperatures on algific slopes would continue. Approximately 40 acres of native prairie would be restored at the Howard Creek Unit and prescribed burning would continue in order to maintain prairie habitat. Other forests and former agricultural fields would be left to natural succession. Conservation site plans for potential acquisition areas would be completed. The 3,400 acres of endangered species habitat above the 2004 level would be conserved through acquisition or other means to meet recovery goals for the Iowa Pleistocene snail and contribute to Northern monkshood and Leedy's roseroot recovery goals. Two hundred acres of habitat for glacial relict snails would be conserved.

2.4.2.2 Species Management

Searches for new algific talus slopes or endangered species locations would be done. Recovery plans for the Iowa Pleistocene snail and Northern monkshood would be updated.

2.4.2.3 Visitor Services

Public use opportunities on the Howard Creek and Fern Ridge units would remain the same. However, there has been and will likely be an increase in the number of visitors as the public learns about the areas. At a certain amount of use, impacts to wildlife and their habitat may be seen. Therefore, threshold public use levels would be determined. The McGregor District Visitor Contact Station would be used as the primary public contact location. Some off-site environmental education would occur at current levels of one to two programs per year.

2.4.3 Alternative C – Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation Alternative (Preferred Alternative)

Cold air vent on Driftless Area NWR. USFWS

Background: Permanent protection of habitat is the primary recovery goal for the Iowa Pleistocene snail and Northern monkshood as the habitat cannot be restored once lost and the species are difficult to reintroduce. As well as meeting recovery goals, protection of additional algific slopes or maderate cliffs would meet the Service's goals of conserving biological integrity, diversity and environmental health. Refuge land protection will meet key recovery goals for these species and may prevent future listing of other land snail and plant species.

Permanent conservation of algific talus slopes goes beyond protection of the slope itself from physical disturbance. New information and threats since the recovery plans were written increase the need for active management to meet multiple recovery goals for delisting. Therefore, fewer acres acquired in this alternative will allow limited Refuge resources to address all impacts to the habitat in order for delisting of these species to occur. Some slopes are, or may be, impacted by invasive species (garlic mustard), high local deer populations, erosion runoff into sinkholes, and vegetative succession on adjacent habitat. This alternative takes a long term ecological approach to endangered species conservation and meets multiple recovery goals that can lead to delisting of the Iowa Pleistocene snail during the life of the CCP. The Service also has the responsibility to manage Refuge lands in an ecologically sound manner for other wildlife species. The objectives in this alternative are aimed at taking care of existing Refuge habitats as well as adding lands for endangered species protection.

The total approved acquisition area for the Refuge would be 6,000 acres in 22 counties (four states) according to a revised Land Protection Plan (Appendix I). The LPP is the total Refuge acreage desired to complete the Refuge project and is a longer term plan than the CCP. Expansion into additional counties will allow potential acquisition and protection of large populations, populations across the species' ranges, and protection of the majority of populations. The 2,275 acres listed in the objectives for this alternative is the acreage we believe we can protect within the 15-year life of the CCP given anticipated levels of willing sellers, funding, and the need to accomplish other Refuge objectives in this alternative. The acreage includes that needed to permanently protect algific slopes including sinkholes and buffer areas to protect from adjacent land uses. Protection may also be achieved in cooperation with other agencies.

2.4.3.1 Habitat

Inspection of Refuge units would be increased to 8 hours/week and a law enforcement officer shared with the McGregor District of Upper Mississippi River NWFR. Invasive species control, particularly for garlic mustard, would be increased. Iowa Pleistocene snail and Northern monkshood monitoring would continue. More study of algific slopes, such as determining the impacts of shade to aid with restoration decisions on adjacent habitat, would be completed. A biologist would be added to the staff. Conservation site plans for potential acquisition areas would be completed. Approximately 2,200 acres of endangered species habitat above the 2004 level would be conserved through acquisition or other means to meet delisting criteria of the Iowa Pleistocene snail and contribute to recovery goals for Northern monkshood and Leedy's roseroot. Seventy-five acres above the 2004 level would be conserved to help preclude listing of glacial relict snail species of concern.

Forty acres of grassland would be restored at the Howard Creek Unit. Forty-one acres of forest would be reestablished at the Fern Ridge unit (Figure 16), 7 acres at the Howard Creek unit (Figure 17), and 68 acres at the Pine Creek unit (Figure 18). A management plan would be developed for all other forest lands to describe how forests would provide habitat for migratory birds and other wildlife. Habitat management plans would be prepared for newly acquired lands.

2.4.3.2 Species Management

Surveys for new algific talus slopes and associated species would be done. Species inventories of selected algific talus slopes would aid in understanding of these unique communities. Recovery plans for the Iowa Pleistocene snail and Northern monkshood would be updated. Study of the location and function of sinkholes would be initiated. An evaluation of deer populations and their impacts on the Refuge would be completed.

2.4.3.3 Visitor Services

A wildlife observation trail would be added to the Howard Creek unit. Office and Visitor Center space would continue to be shared with the McGregor District, although space is limited. A new professionally developed interpretive display, as well as increased environmental education would be completed. An interpretive park ranger would be shared with McGregor District under this alternative. Threshold visitor use levels would be determined. A Visitor Services Plan would be completed.

2.5 Detailed Description of Alternatives and Relationship to Goals, Objectives, and Strategies

2.5.1 Features Common to All Alternatives

2.5.1.1 Cultural Resources

Archeological and Cultural Resource Protection: Cultural resources on federal lands receive protection and consideration that would not normally apply to private or local and state government lands. This protection is through several federal cultural resources laws, executive orders, and regulations, as well as policies and procedures established by the Department of the Interior and the Service. The presence of cultural resources including historic properties cannot stop a federal undertaking since the several laws require only that adverse impacts on historic properties be considered before irrevocable damage occurs. However, the Refuge will seek to protect cultural resources whenever possible.

During early planning of any projects, the Refuge will provide the Regional Historic Preservation Officer (RHPO) a description and location of all projects and activities that affect ground and structures, including project requests from third parties. Information will also include any alternatives being considered. The RHPO will analyze these undertakings for potential to affect historic properties and enter into consultation with the State Historic Preservation Officer and other parties as appropriate. The Refuge will also notify the public and local government officials to identify any cultural resource impact concerns. This notification is generally done in conjunction with the review required by the National Environmental Policy Act or Service regulations on compatibility of uses.

2.5.1.2 Fire Management

The following section contains detail about the prescribed fire and wildfire suppression procedures used on the Driftless Area NWR. We have included more detail on this subject here and in Chapter 4 in order to fully document the Refuge's recent Fire Management Plan in compliance with the National Environmental Policy Act.

Figure 16: Future Desired Conditions, Fern Ridge Unit, Driftless Area NWR

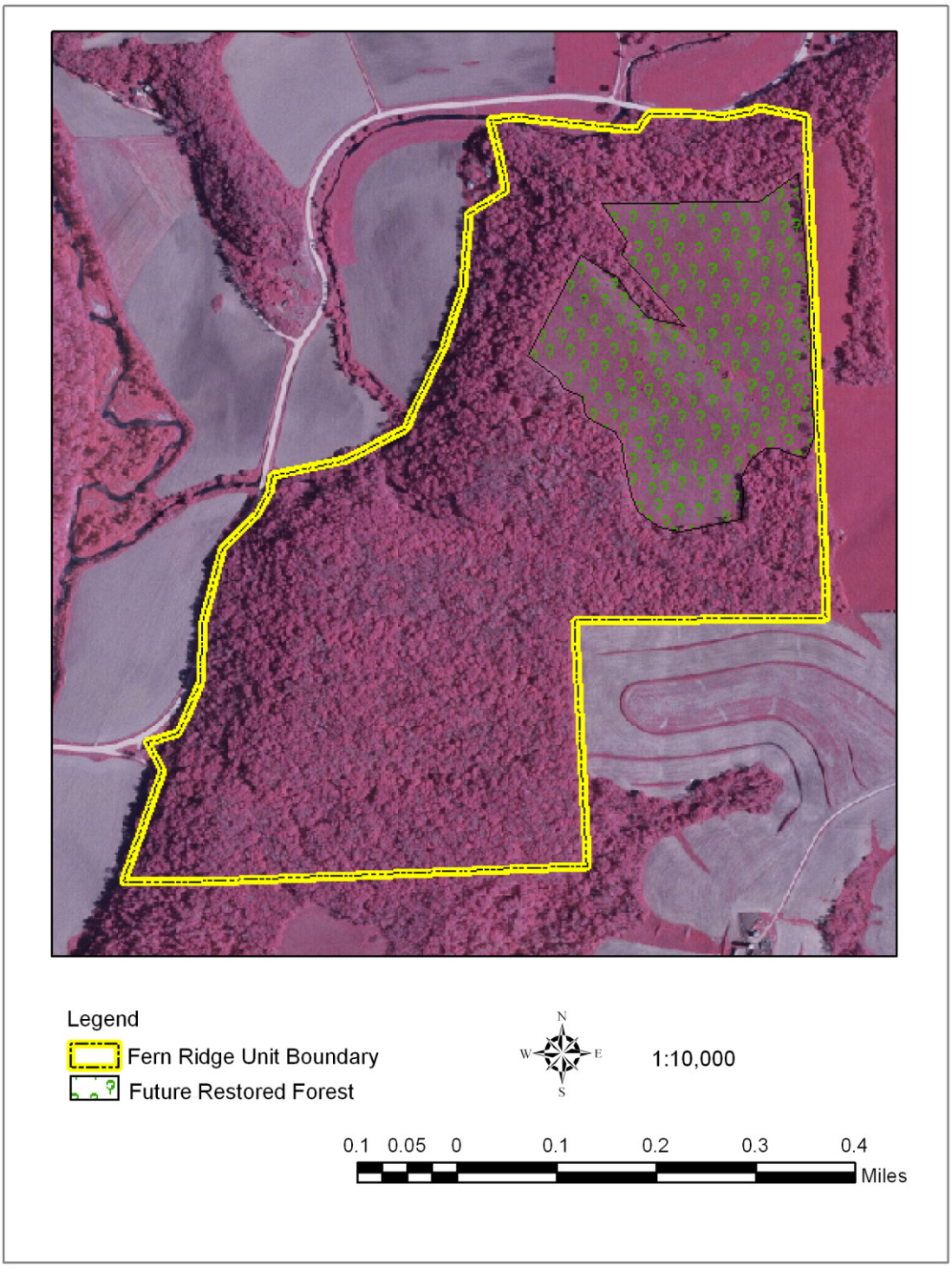


Figure 17: Future Desired Condition, Howard Creek Unit, Driftless Area NWR

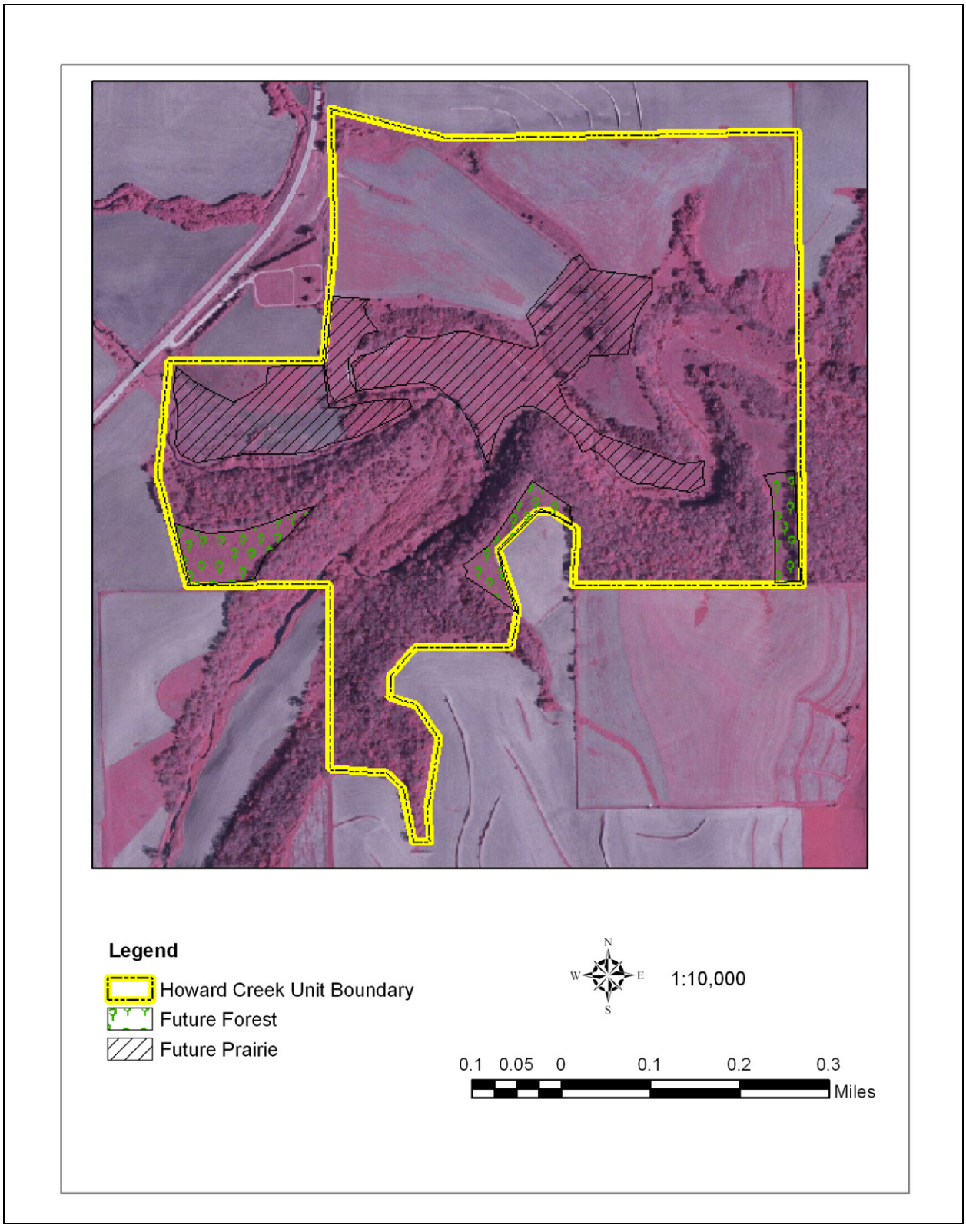
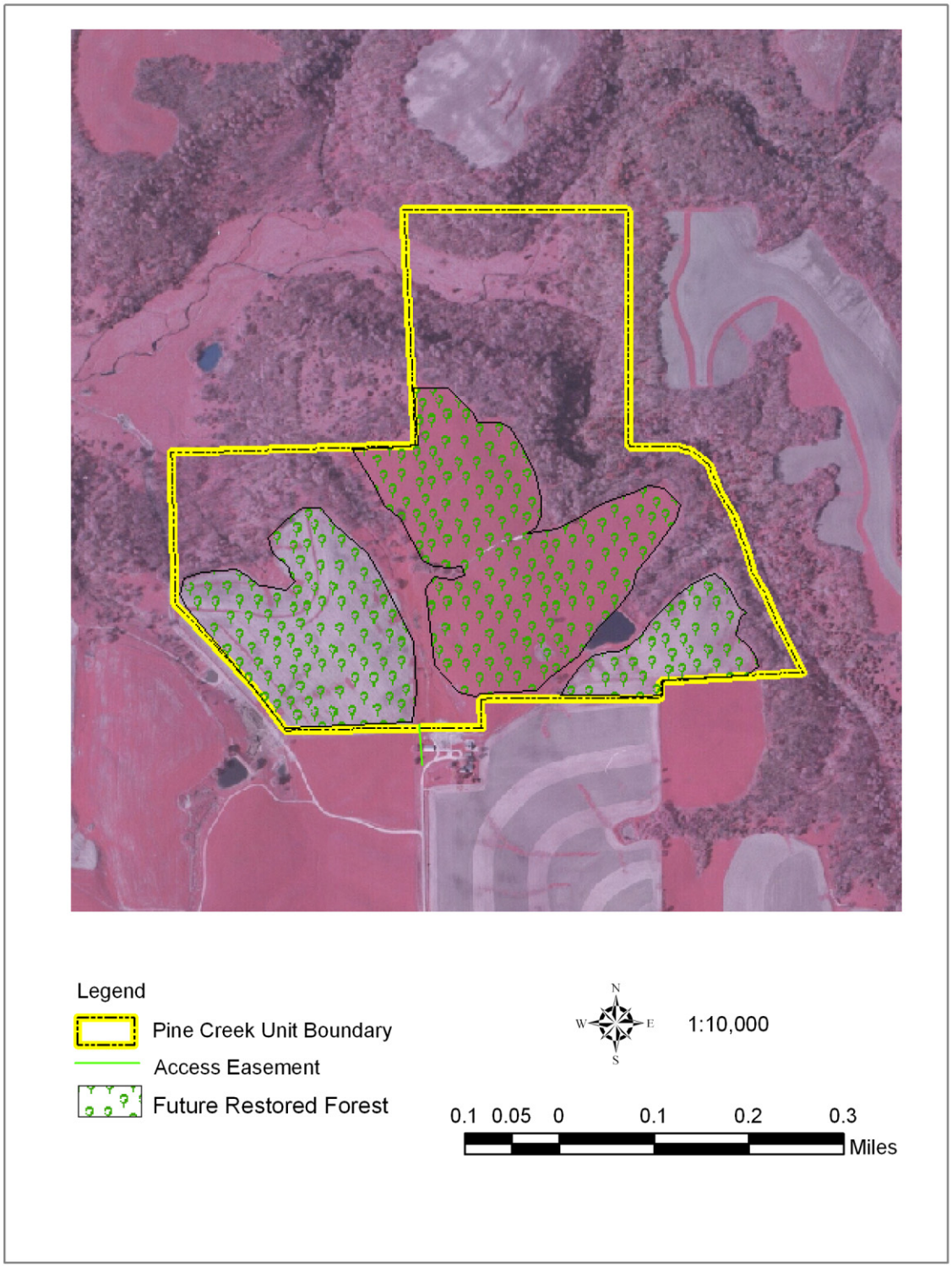


Figure 18: Future Desired Condition, Pine Creek Unit, Driftless Area NWR



2.5.1.2.1 Prescribed Fire

Prescribed fire is used regularly on the Refuge as a habitat management tool. Periodic burning of grasslands reduces encroaching woody vegetation such as box elder. Fire also encourages the growth of desirable species such as native, warm-season grasses and forbs.

Trained and qualified personnel perform all prescribed burns under precise plans. The Refuge has an approved Fire Management Plan that describes in detail how prescribed burning will be conducted. A burn is conducted only if it meets specified criteria for air temperature, fuel moisture, wind direction and velocity, soil moisture, relative humidity, and several other environmental factors. The specified criteria (prescription) minimize the chance that the fire will escape and increase the likelihood that the fire will have the desired effect on the plant community.

Constructing firebreaks usually involves some shallow ground disturbance that could damage or destroy cultural and archaeological resources. If a firebreak is needed on undisturbed ground, the area will be surveyed prior to construction to protect any cultural or archaeological resources.

Prior to the burning season, the Service's Division of Ecological Services will review the Refuge's Fire Management Plan to ensure that prescribed burning will not negatively impact listed species. Precautions will be taken to protect threatened and endangered species during prescribed burning. Algific slopes, where endangered species occur on the Refuge, likely would not burn if a fire escaped into those areas. They are cool, damp, rocky, and contain mosses, ferns and vegetation that provides little fuel. If prescribed burning occurs near an algific slope, a fire break is placed adjacent to it.

Prescribed burn on a prairie. USFWS

Vehicle tracks through the burn are visible on the freshly burned ash and may be longer lived if the vehicle created ruts in the ground. Travel across the burn area will be kept to a minimum. Vehicle travel is necessary in some instances, such as lighting the fire lines or quickly getting water to an escape point. Disced fire breaks may still be visible for a few months after the burn, but are not visible by the next season.

Thus far, all prescribed burning has occurred in the spring. Fall burns may be used in the future. How often established units are burned depends on management objectives, historic fire frequency, and funding. The interval between burns may be 1 to 5 years or longer. As part of the prescribed fire program, we will conduct a literature search to determine the effects of fire on various plant and animal species, and we will begin a monitoring program to verify that objectives are being achieved.

Prescribed fires will not be started without the approval of the Regional Fire Management Coordinator when the area is at an extreme fire danger level or the National Preparedness level is V. In addition, we will not start a prescribed fire without first getting applicable concurrence when local fire protection districts or the State of Iowa have instituted burning bans.

The impact of smoke can be reduced through management actions, which include: signing, altering ignition techniques and sequence, halting ignition, suppressing the fire, and use of local law enforcement officers to assist with traffic control. Burning will be done only when the smoke will not be blown across local communities or when the wind is sufficient to prevent heavy concentrations. In the event of wind direction change, mitigative measures will be taken to assure public safety and comfort. Refuge staff will work with neighboring agencies and State air quality personnel to address

smoke issues that require additional mitigation. The Prescribed Fire Plan describes specific measures to deal with smoke management problems.

Spot fires and escapes may occur on any prescribed fire. The spot fires and escapes may result from factors that cannot be anticipated during planning. A few small spot fires and escapes on a prescribed burn can usually be controlled by the burn crew. If so, they do not constitute a wildland fire. The burn boss is responsible for evaluating the frequency and severity of spot fires and escapes and, if necessary, slowing down or stopping the burn operation, getting additional help from the Refuge staff, or extinguishing the prescribed burn. If the existing crew cannot control an escaped fire and it is necessary to get help from local fire units, the escape will be classified as a wildland fire and controlled accordingly. Once controlled, we will stop the prescribed burning for the burning period.

We will exercise extreme care, careful planning, and adherence to the unit prescription when we conduct all prescribed burns. We will place an extra emphasis on control when burning areas that are near developed areas or the Refuge boundary.

In the event that a prescribed fire does jump a firebreak and burn into unplanned areas, there is a high probability of rapid control with minimal adverse impact. Most Refuge lands are surrounded by agricultural fields that are bare ground or only contain stubble in the spring. In general, prescribed burns will be small in size (5 to 100 acres), have light fuel loads (0.25 to 3 tons of fuel per acre), will be burned under low fuel moisture conditions, and will be burned under specific wind direction and atmosphere stability conditions. The firebreaks will greatly assist in rapid containment. In most cases all of the Refuge fire fighting equipment will be immediately available at the scene with all nearby water sources previously located. The applicable local fire departments will always be notified of a prescribed burn. Thus, maximum numbers of experienced personnel and equipment are immediately available for wildfire suppression activities.

2.5.1.2.2 Fire Prevention and Detection

In any fire management activity, firefighter and public safety will always take precedence over property and resource protection.

Historically, fire influenced the vegetation on the Refuge. Now, fires burning without a prescription are likely to cause unwanted damage. In order to minimize this damage, we will seek to prevent and quickly detect fires by:

- Discussing fire prevention at safety meetings prior to the fire season and during periods of high fire danger and periodically training staff in fire prevention.
- Posting warnings at visitor information stations during periods of extreme fire danger.
- Notifying the public via press releases and personal contacts during periods of extreme fire danger.
- Investigating all fires suspected of having been set illegally and taking appropriate action.
- Depending on neighbors, visitors, cooperators, and staff to detect and report fires.

2.5.1.2.3 Fire Suppression

We are required by Service Policy to use the Incident Command System (ICS) and firefighters meeting National Wildfire Coordinating Group (NWCG) qualifications for fires occurring on Refuge property. Our suppression efforts will be directed towards safeguarding life while protecting Refuge resources and property from harm. Mutual aid resources responding from Cooperating Agencies will not be required to meet NWCG standards, but must meet the standards of their Agency.

All wildland fires occurring on the Refuge and staffed with Service employees will be supervised by a qualified Incident Commander (IC). The IC will be responsible for all management aspects of the fire. The IC will obtain the general suppression strategy from the Fire Management Plan, but it will

be up to the IC to implement the appropriate tactics. Minimum impact suppression tactics will be used whenever possible. As a guide, on low intensity fires (generally flame lengths less than 4 feet) the primary suppression strategy will be direct attack with hand crews and engines. On higher intensity fires (those with flame lengths greater than 4 feet) we may use indirect strategies of back fires or burning out from natural and human-made fire barriers. The barriers will be selected based on their ability to safely suppress the fire, minimize resource degradation, and be cost effective.

2.5.2 Alternative A: No Action

2.5.2.1 Habitat Goal

Goal: Conserve endangered species habitat and contribute migratory bird and other wildlife habitats within a larger landscape.

Objective 1: Maintain protection of the biological integrity of Refuge algific talus slopes at 2004 levels.

Rationale: This objective is tied to the purpose of the Refuge and Iowa Pleistocene snail and Northern monkshood recovery plan goals for permanent protection of habitat.

Strategies:

1. Maintain existing closed areas.
2. Ensure boundary signing and fencing on all units are adequate.
3. Maintain inspection of units, on average 4 hours per week, particularly during hunting seasons.
4. Share a law enforcement officer with the McGregor District of UMRNWFR.
5. Maintain contact with Refuge neighbors at current levels.
6. Remove garlic mustard from algific slopes at the Howard Creek Unit.
7. Monitor Iowa Pleistocene snail and Northern monkshood populations (on Refuge and other public and private lands) at 2004 level of effort to measure population trends for recovery and as an indicator of habitat condition.
8. Monitor soil/vent temperatures on algific talus slopes with data loggers that collect daily temperature.

Objective 2: Restore existing 40 acres of grassland to a mixture of at least 25 species of local genotype grasses and forbs by 2009.

Rationale: Other wildlife habitats are present on the Refuge and should be managed for Service trust resources when possible. Native climax vegetation would likely do best on the land and require the least long term maintenance once established. The Howard Creek unit contains remnant native prairies and much of the area was once prairie or savanna. Some planting of native prairie species has already taken place on this unit and this objective is aimed at completing grassland restoration for the Howard Creek unit.

Strategies:

1. 1. Use fire and other techniques to control invading woody vegetation on remnant and restored prairies.
2. Plant a mixture of native grasses and forbs (local genotype).

3. Use biological, chemical, and mechanical controls, as feasible, to control invasive species in grasslands.
4. Partner with local groups to restore prairie.

Objective 3: Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2020.

Rationale: Similar to Objective 2, this objective is aimed at providing quality wildlife habitat surrounding endangered species habitat. The majority of Refuge habitat is, or was, historically hardwood forest that has been impacted by past land uses. Habitat immediately adjacent to algific talus slopes may affect such factors as microclimate (i.e. shade helps maintain cool conditions) and encroachment of invasive species. Restoration of forests is important to maintaining endangered species habitat.

Although Refuge units are small, they do provide habitat for Region 3 Resource Conservation Priority species and migratory non-game birds of management concern. Fragmentation of habitats both within and around Refuge lands is a concern for migratory bird management because of the resultant increased effects of predators and cowbird nest parasitism. Restoration of native vegetation on the Refuge would reduce, but not eliminate, fragmentation within units and would provide closer connection to forest in the surrounding landscapes. The amount of restoration described here is what can be done with current staff and other resources.

Strategies:
1. Plant 48 acres with native forest species on the Fern Ridge (41 ac), and Howard Creek (7 ac) units and develop and implement forest management plans for existing forests on the Fern Ridge and Bankston units during the life of the plan. Let natural succession occur on areas that are not actively planted.

Objective 4: Working with others, permanently conserve 1,000 additional acres of endangered species habitat above the 2004 level to contribute to recovery goals of the Iowa Pleistocene snail, Northern monkshood, and Leedy's roseroot.

Rationale: The Refuge purpose is to conserve endangered and threatened species, and the Refuge is at its approved acquisition acreage. However, the Iowa Pleistocene snail and Northern monkshood recovery plan goals for permanent protection of habitat have not been achieved. The Refuge would therefore help others protect additional habitat for these species.

Strategies:
1. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
2. Help partners secure funding to conserve sites through a variety of means, such as funding available under provisions of the Endangered Species Act (Section 6), land trust conservation easements, U.S. Department of Agriculture programs, and fund raising.

2.5.2.2 Species Management Goal

Goal: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

Objective 1: By 2008, determine the appropriate deer density and population structure for Refuge units that will safeguard habitat.

Rationale: Deer populations in northeast Iowa have been high for several years. There is concern that high deer densities, particularly on units where hunting is not allowed, could impact algific talus slopes as well as other habitats. The population level that causes negative impacts needs to be determined.

Strategies:

1. Use research or literature searches to determine the current and desired deer density on the Refuge.
2. Working with states, manage deer populations at a level and population structure that does not negatively impact algific slopes or associated habitats.

Objective 2: Update the recovery plans for Iowa Pleistocene snail and Northern monkshood within 5 years of CCP approval.

Rationale: The current recovery plans for these species are outdated and do not include all locations, specific recovery objectives, threats, or specific monitoring guidelines. Updated plans would provide for better planning and species protection and increase the likelihood of recovery.

Strategies:

1. Work with Ecological Services and applicable states to update and rewrite draft recovery plans.

2.5.2.3 Visitor Services Goal

Goal: Visitors have an understanding and appreciation of the role of the Refuge in conserving endangered species.

Objective 1: Maintain wildlife-dependent recreation opportunities at levels offered in 2004.

Rationale: Visitors develop understanding and appreciation of wildlife and conservation through participation in wildlife-dependent recreation. Compatible wildlife-dependent recreation would be restricted to those units where there is legal public access and sufficient acreage surrounding endangered species habitat.

Strategies:

1. Howard Creek and Fern Ridge units remain open to upland game and white-tailed deer hunting.
2. Steeles Branch and Fern Ridge units remain open to fishing.
3. Howard Creek and Fern Ridge units remain open to wildlife observation and photography.

4. Maintain McGregor District Visitor Contact Station as place of primary public contact.
5. Conduct off-site education at 2004 levels of one to two programs per year.
6. Develop a Visitor Services Plan within 2 years of CCP approval.
7. Continue to include volunteers when possible and work with Friends of the Upper Mississippi River Refuges.

2.5.3 Alternative B: Habitat Protection

2.5.3.1 Habitat Goal

Goal: Conserve endangered species habitat and contribute to migratory bird and other wildlife habitats within a larger landscape.

Objective 1: Limit activity on algific slopes to only endangered species monitoring every three years by 2007. Increase inspection of Refuge units to 8 hours per week by 2007 to protect the biological integrity of Refuge algific talus slopes.

Rationale: This objective is tied to the purpose of the Refuge and Iowa Pleistocene snail and Northern monkshood recovery plan goals for permanent protection of habitat. The algific talus slopes are fragile because of the steep slopes with a loose surface rock layer. Human activity can cause rock slides, compact surface cold air vents, and crush snails and plants. Although closed to all public entry, current Refuge management activities on algific slopes include garlic mustard removal and endangered species monitoring on and off Refuge. This objective is aimed at providing enhanced protection of the physical environment of algific talus slopes.

Strategies:

1. Maintain existing closed areas.
2. Ensure boundary signing and fencing on all units are adequate.
3. Inspect units, on average 8 hours per week, particularly during hunting seasons.
4. Share a law enforcement officer with the McGregor District of UMRNWFR.
5. Remove garlic mustard from lands adjacent to algific talus slopes, but not on the slopes themselves to reduce disturbance.
6. Monitor Iowa Pleistocene snail and Northern monkshood populations every three years to measure population trends for recovery and as an indicator of habitat condition.
7. Maintain contact with Refuge neighbors at existing frequency of about twice per year.
8. Monitor soil/vent temperatures on algific talus slopes with data loggers that collect daily temperature.

Objective 2:. Restore existing 40 acres of grassland on the Howard Creek unit to a mixture of at least 25 species of local genotype grasses and forbs by 2009.

Rationale: same as Alternative A.

Strategies:

1. Use fire and other techniques to control invading woody vegetation on remnant and restored prairies.

2. Use biological, chemical, and mechanical controls as time allows to control invasive species.
3. Develop partnerships with local groups to restore prairie and possibly create demonstration areas.
4. Plant a mixture of native grasses and forbs (local genotype)

Objective 3: Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2020.

Rationale: same as Alternative A.

Strategies:

1. Let natural succession occur on all units.

Objective 4: Permanently conserve 3,200 additional acres of endangered species habitat above the 2004 level to reach this recovery goal for the Iowa Pleistocene snail and contribute towards recovery goals for Northern monkshood and Leedy's roseroot by 2020.

Rationale: This objective is tied to the purpose of the Refuge and species' recovery plan goals for permanent protection of habitat. More habitat protection is needed to reach these recovery goals. Refuge land protection can lead to delisting of these species and may prevent future listing of other land snail and plant species. Refuge land protection will also conserve biological integrity, diversity, and environmental health according to Service policy.

Overall Refuge expansion is proposed at 6,000 acres in 22 counties (four states) under a revised Land Protection Plan (Appendix I). The LPP is the total Refuge acreage desired to complete the Refuge project and is a longer term plan than the CCP. Expansion into additional counties will allow potential acquisition of large populations, populations across the species' ranges, and of the majority of their populations. Acquisition would not necessarily occur in every location, but where willing sellers exist for known species locations in any of these counties. Acquisition acreage includes algific slopes, associated sinkholes, and buffer areas needed to permanently protect them from adjacent land uses. The acreage listed in this alternative is what we believe is possible to protect during the next 15 years, given willing sellers, funding, and Refuge resources. Protection may also be in cooperation with other agencies.

Strategies:

1. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
2. Acquire additional land adjacent to Refuge sites where the algific slopes or sinkholes are not under permanent conservation.
3. Protect an additional 40 snail and monkshood sites through acquisition, easement, or other means.
4. Coordinate with the Minnesota Ecological Services office and the Minnesota DNR to identify and acquire any of the three Leedy's roseroot sites that become available.

5. Seek consistent annual Land and Water Conservation Fund appropriations to meet the objective.
6. Work with partners to protect sites through a variety of means such as funding provisions of the Endangered Species Act (Section 6), land trust conservation easements, U.S. Department of Agriculture programs, fund raising, congressional appropriations.
7. Prioritize sites for protection and prepare site preservation plans in Geographic Information System format with state and partner input.
8. Protect sites through conservation easements and fee title acquisition.

Objective 5: Permanently conserve 200 additional acres of habitat above the 2004 level to help preclude listing of glacial relict species of concern by 2020.

Rationale: Some algific slopes are occupied by Service species of concern, but not by threatened and endangered species. Implementation of this objective would begin to conserve sites for species of concern to help preclude future listing.

Strategies:

1. Protect five sites for other Service species of concern.
2. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
3. Protect sites through conservation easements and fee title acquisition.

2.5.3.2 Species Management

Goal: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

Objective 1: Identify and evaluate new algific slopes in the Driftless Area for the presence of threatened and endangered species and species of concern within 3 years of plan approval.

Rationale: Initial surveys to locate algific talus slopes and associated species were done in the 1980s. Several new algific slopes were found in the last few years just by casual observation, indicating that more may be present than is currently known. A renewed comprehensive survey should be done to ensure that as many algific slopes as possible are known. This information may shed new light on species abundance or threats to endangered and rare species. Survey of potential habitat is a recovery goal.

Strategies:

1. Review existing algific slope records to identify potential new survey locations. Actively search areas that may have been underrepresented in original surveys. Survey any new locations for Iowa Pleistocene snail and Northern monkshood.
2. Seek assistance from Refuge partners such as TNC to provide funding or people to accomplish objective.

Objective 2: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.

Rationale: same as Alternative A.

Strategies:
1. Work with Ecological Services and applicable states to update and rewrite a draft recovery plan.

2.5.3.3 Visitor Services Goal

Goal: Visitors have an understanding and appreciation of the role of the Refuge in conserving endangered species.

Objective 1: Provide wildlife-dependent recreation opportunities at levels offered in 2004 and establish a reliable system for documenting and monitoring public use within 5 years of CCP approval.

Rationale: Visitors develop understanding and appreciation of wildlife and conservation through wildlife-dependent recreation. However, there is a level that could cause unacceptable changes in habitat and wildlife. To better achieve the endangered species purpose of the Refuge, the level below which impacts are negligible needs to be determined.

Strategies:
1. Howard Creek and Fern Ridge units would remain open to upland game and white-tailed deer hunting.
2. Steeles Branch and Fern Ridge units would remain open to fishing.
3. Howard Creek and Fern Ridge units remain to wildlife observation and photography.
4. Maintain McGregor District Visitor Contact Station as place of primary public contact.
5. Establish a reliable system for documenting and monitoring public use within 2 years of CCP approval.
6. Establish relationship between level of use and impacts to resources within 5 years of plan approval and modify the Visitor Services Plan accordingly.
7. Conduct off-site environmental education at 2004 levels (1 to 2 per year).
8. Develop a Visitor Services Plan within 2 years of CCP approval.
9. Continue to work with the Friends of Upper Mississippi River Refuges and include volunteers when possible.

2.5.4 Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation

2.5.4.1 2.4.4.1 Habitat Goal

Goal: Conserve endangered species habitat and contribute migratory bird and other wildlife habitats within a larger landscape.

Objective 1: Increase management of physical and biological impacts to algific slopes by eliminating invasive species (on slopes), maintaining zero impacts from public use, and reducing off Refuge impacts on two units by 2015.

Rationale: The Refuge purpose is to conserve endangered and threatened species. This objective is tied to the purpose of the Refuge and Iowa Pleistocene snail and

Northern monkshood recovery plan goals for permanent protection of habitat. Algific talus slopes are fragile because of the steep slopes with a loose surface rock layer. All algific slopes would remain closed to all public entry. However, some management activity on algific slopes is needed to maintain their biological integrity. Invasive garlic mustard is competing with Northern monkshood. It has unknown effects on the Iowa Pleistocene snail, but we speculate garlic mustard could affect its specific food requirements. Removal of garlic mustard can be completed by carefully hand pulling it on some sites, but may take several years to control using this method because of the seed bank present. Vegetation adjacent to algific talus slopes can affect temperatures and other microclimate characteristics important to the species that inhabit them. Study of the impact of shade on algific talus slopes would help in determining what the best restoration options are adjacent to the slopes. Population monitoring of both species would continue at 2004 levels on selected sites on and off Refuge. These management activities would be done under specific guidelines such as restricting the number of people, number of sites, avoiding more sensitive sites, using wildlife trails, and other restrictions to prevent damage to the habitat.

Strategies:

1. Maintain existing closed areas.
2. Ensure boundary signing and fencing on all units are adequate
3. Increase inspection of units, on average 8 hours per week, particularly during hunting seasons.
4. Share a law enforcement officer with the McGregor District of UMRNWFR.
5. Increase contact with landowners adjacent to the Refuge to prevent impacts from grazing, logging, invasive species, erosion, and sinkhole filling. Specifically, use USDA programs, Partners for Fish and Wildlife program or endangered species funding to reduce erosion impacts to the Fern Ridge and Cow Branch units.
6. Remove all garlic mustard from algific slopes on the Howard Creek and Lytle Creek units in ways that minimize disturbance. Expand garlic mustard control efforts in surrounding habitats on all units.
7. Monitor Iowa Pleistocene snail and Northern monkshood populations (on Refuge and other public and private lands) at 2004 level of effort to measure population trends for recovery and as an indicator of habitat condition.
8. Monitor soil/vent temperatures on algific talus slopes with data loggers that collect daily temperature.
9. Fund research to determine impacts of shade on algific talus slopes, particularly in regard to Northern monkshood. Complete study by 2010. This would aid in determining the best restoration alternative adjacent to algific slopes.
10. Add a wildlife biologist to the staff to help accomplish additional work.

Objective 2: Restore existing 40 acres of grassland on the Howard Creek Unit to a mixture of at least 25 species of local genotype grasses and forbs by 2009.

Rationale: same as Alternative A.

Strategies:

1. Use fire and other techniques to control invading woody vegetation on remnant and restored prairies.
2. Use biological, chemical, and mechanical controls to control invasive species on other habitats.
3. Develop partnerships with local groups to restore prairie and possibly create demonstration areas.
4. Plant a mixture of native grasses and forbs (local genotype).

Objective 3: Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2012.

Cold air vent and mosses on algific slope. USFWS

Rationale: The majority of Driftless Area Refuge habitat is or was hardwood forest that has been impacted by past agricultural or logging uses. Some forests are degraded and some were completely cleared for farming. Habitat immediately adjacent to algific talus slopes may affect such factors as microclimate (i.e. shade helps maintain cool conditions) and encroachment of invasive species. Restoration of forests is important to maintaining endangered species habitat.

Although Refuge units are relatively small, they do provide habitat for Region 3 Resource Conservation Priority species and migratory non-game birds of management concern. Fragmentation of habitats both within and around Refuge lands is a concern for migratory bird management because of the effects of predators and parasitic cowbirds. Restoration of native vegetation on the Refuge would reduce, but not eliminate, fragmentation within units and would provide closer connection to forest in the surrounding landscapes. Active restoration by planting trees would speed restoration and provide the species desired for wildlife habitat.

Strategies:

1. Plant 116 acres of native forest on the Pine Creek (68 ac), Fern Ridge (41 ac), and Howard Creek units (7 ac) (Figure 16,Figure 17 and Figure 18).
2. Develop partnerships with local groups to restore forests and evaluate feasibility of establishing reforestation demonstration areas.
3. Inventory exotic invasive species and develop plans for control on each unit.

4. Write habitat management plans for each Refuge unit and implement forest management plans for existing forests on the Fern Ridge and Bankston units during the life of the plan.

Objective 4: Permanently conserve 2,200 additional acres of endangered species habitat above the 2004 level to achieve this recovery goal for the Iowa Pleistocene snail and contribute to recovery goals for the Northern monkshood and Leedy's roseroot by 2020.

Rationale: This objective is tied to the purpose of the Refuge and species' recovery plan goals for permanent protection of habitat. More habitat protection is needed to reach these recovery goals. Refuge land protection can lead to delisting of these species and may prevent future listing of other land snail and plant species. Refuge land protection will also conserve biological integrity, diversity, and environmental health according to Service policy.

Overall Refuge expansion is proposed at 6,000 acres in 22 counties (four states) under a revised Land Protection Plan (Appendix I). The LPP is the total Refuge acreage desired to complete the Refuge project and is a longer term plan than the CCP. Expansion into additional counties will allow potential acquisition of large populations, populations across the species' ranges, and of the majority of their populations. Acquisition would not necessarily occur in every location, but where willing sellers exist for known species locations in any of these counties. Acquisition acreage includes algific slopes, associated sinkholes, and buffer areas needed to permanently protect them from adjacent land uses. The acreage listed in this alternative is what we believe is possible to protect in the next 15 years given willing sellers, funding, and Refuge resources. There is less acreage identified in Alternative C than Alternative B so that Refuge resources can be used for other objectives. Habitat protection may also be in cooperation with other agencies.

Strategies:

1. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
2. Acquire additional land adjacent to Refuge sites where the algific slopes or sinkholes are not under permanent protection.
3. Protect an additional 20 snail and monkshood sites.
4. Coordinate with the Ecological Services office and Minnesota DNR to identify and acquire any Leedy's roseroot site that becomes available.
5. Seek consistent annual Land and Water Conservation Fund appropriations to meet the objective.
6. Work with partners to protect sites through a variety of means such as funding provisions of the Endangered Species Act (Section 6), land trust conservation easements, U.S. Department of Agriculture programs, fund raising, and congressional appropriations.
7. Prioritize sites for protection and prepare site preservation plans in Geographic Information Systems format with state and partner input.
8. Protect sites through conservation easements and fee title acquisition.

Objective 5: Permanently conserve 75 additional acres of habitat above the 2004 level to help preclude listing of glacial relict species of concern by 2020.

Rationale: Some algific slopes are occupied by Service species of concern, but not by threatened and endangered species. This objective would begin to protect sites for these species to help preclude future listing as threatened or endangered.

Strategies:

1. Protect 3 sites for other species of concern.
2. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
3. Protect sites through conservation easements and fee title acquisition.

2.5.4.2 Species Management

Goal: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

Objective 1: Identify and evaluate new algific slopes in the Driftless Area for the presence of threatened and endangered species and species of concern within 3 years of plan approval.

Rationale: same as Alternative B.

Strategies:

1. Review existing algific slope records to identify potential new survey locations. Actively search areas that may have been underrepresented in original surveys. Survey any new locations for Iowa Pleistocene snail and Northern monkshood.
2. Seek assistance from Partners to provide funding or people to accomplish objective.

Objective 2: Establish the size of upland buffers needed to provide permanent protection of algific talus slopes by 2009.

Rationale: Sinkholes are crucial to cold air flow on algific talus slopes. Their function, locations, and distance from slopes is not completely known. In addition, more information is needed on sinkhole locations and distance from algific talus slopes. This objective is also a recovery task for the Iowa Pleistocene snail and is essential to determining land protection areas and strategies.

1. Conduct winter surveys to locate sinkholes associated with algific slopes to aid in protection efforts.
2. Initiate studies to determine the function and association of sinkholes and other features to cold air flow and hydrology.

Objective 3: Gain a better understanding of plants and animals associated with algific talus slopes and similar habitats in the Driftless Area.

Rationale: Comprehensive surveys for plants and insects have never been done for algific talus slopes. There may be additional rare, endemic or new species.

Inventory of wildlife on other Refuge habitats has not been completed. An inventory of Refuge plant and animal communities is needed to prepare effective management strategies. The Refuge Improvement Act also requires inventory and monitoring of fish, wildlife, and plants on all Refuges. Refuge partners are also interested in inventory of algific slopes.

Strategies:

1. Work with experts to inventory snail, plant and insect species on six or more algific talus slopes within 8 years of plan approval.
2. Inventory birds on Refuge units to document habitat use and develop plans for management of conservation priority species on the Refuge.

Objective 4: By 2008, determine the appropriate deer density and population structure for Refuge units that will safeguard habitat.

Rationale: Same as Alternative A.

Strategies:

1. Use research or literature searches to determine the current and desired deer density on the Refuge.
2. Working with states, manage deer populations at a level and population structure that does not negatively impact algific slopes or associated habitats.

Objective 5: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.

Rationale: Same as Alternative A.

Strategies:

1. Work with Ecological Services and applicable states to update and rewrite draft recovery plans.

2.5.4.3 Visitor Services Goal

Goal: Visitors have an understanding and appreciation of the role of the Refuge in conserving endangered species.

Objective 1: Increase environmental education programs by 50 percent within 8 years of CCP approval and establish a reliable system for documenting and monitoring public use within 5 years of CCP approval.

Rationale: Promotion of the Refuge and wildlife-dependent recreation has historically been limited because of the sensitive nature of endangered species habitat and limited staff to manage public use. However, the public is now more aware of land owned by the Service and has expressed interest in increasing outreach and wildlife-dependent recreation opportunities. With targeted programs, visitors' understanding of the Refuge's purpose can be enhanced. Education about

endangered species and the special resources of the Driftless Area may promote stewardship among landowners and therefore further protection of rare and endangered species. Education about snails and their habitat is a recovery task.

Only units with public access routes and sufficient acreage surrounding endangered species habitat would be open to the public. However, there is a level of use that could cause unacceptable changes in habitat and wildlife. To better achieve the endangered species purpose of the Refuge, the level below which impacts are negligible needs to be determined. The primary increased use would be off-site environmental education.

White-tailed deer doe. USFWS

Strategies:

1. Howard Creek and Fern Ridge units would remain open to upland game and white-tailed deer hunting.
2. Steeles Branch and Fern Ridge units would remain open to fishing.
3. Howard Creek and Fern Ridge units would remain open to wildlife observation and photography.
4. Maintain McGregor District Visitor Contact Station as place of primary public contact.
5. Develop information kiosk at the Fern Ridge unit by 2007.
6. Develop a wildlife observation trail at the Howard Creek Unit by 2008.
7. Develop an interpretive display at McGregor District Visitor Contact Station by 2007.
8. Present local school groups at least 10 environmental education programs per year, with an emphasis on endangered species.
9. Share an interpretive park ranger with the McGregor District.
10. Develop a Visitor Services Plan within 2 years of CCP approval. The Plan will describe basic visitor and resource protection, appropriate signing, informational brochures, Visitor Center displays, and other information needed for visitors to have an educational and enjoyable experience.
11. Permit compatible wildlife-dependent recreation on newly acquired lands.
12. Establish a reliable system for documenting and monitoring public use within 2 years of CCP approval.
13. Establish the relationship between level of use and impacts to resources within 5 years of plan approval and modify the Visitor Services Plan accordingly.
14. Develop a volunteer program and continue to work with the Friends of the Upper Mississippi River Refuges.

2.6 Comparison of Alternatives

Table 2 provides a comparison of the three alternatives.

2.6.1 Comparison of Funding and Personnel Needs by Alternative

Alternative A would need the same budget as 2004. Alternative B would require land acquisition funds, but no additional staff. Alternative C would be more expensive with one more staff person and additional staff shared with the McGregor District. Additional funding for invasive species control and restoration would also be needed.

Land values in northeast Iowa have increased in recent years, at least partly due to an interest in recreational land. The 2003 Iowa State Land Value Survey gives average values of farmland at $1,645 per acre in Allamakee County, $2,111 per acre in Clayton County, $1,904 per acre in Winneshiek County, and $2,722 per acre in Dubuque County. The Vernon County Land and Water Conservation Department in Wisconsin reports farmland values at about $2,000 per acre. Land values in Olmsted County, Minnnesota, in 2004 averaged $3,236 per acre and in Fillmore County $1,868 per acre as estimated by county assessors. These values do not distinguish between forested land and cropland. Forested land is often being sold for the same value as cropland because of the recreational interest. Therefore, an average value for northeast Iowa counties, where the majority of land acquisition would occur, would be $2,095 per acre. Acquiring 3,400 acres under Alternative B would then cost approximately $7,123,000 and acquiring 2,275 acres under Alternative C would cost approximately $4,766,125.

Potential partnerships exist with The Nature Conservancy, Iowa Natural Heritage Foundation, States, universities, and other private conservation groups to accomplish the objectives outlined in the CCP. Partners have specifically expressed interest in assisting with habitat protection, landowner contacts, site preservation plans, habitat restoration, inventory, and study.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
Habitat Goal: Conserve endangered species habitat and contribute migratory bird and other wildlife habitats within a larger landscape.		
Objective 1. Maintain protection of the biological integrity of Refuge algific talus slopes at 2004 levels.	Objective 1. Limit activity on algific slopes to only endangered species monitoring every three years by 2006. Increase inspection of Refuge units to 8 hours per week by 2006 to protect the biological integrity of Refuge algific talus slopes.	Objective 1: Increase management of physical and biological impacts to algific slopes by eliminating invasive species (on slopes), maintaining zero impacts from public use, and reducing off Refuge impacts on two units by 2015.
Strategies:	*Strategies:*	*Strategies:*
Maintain existing closed areas.	Same as Alt. A	Same as Alt. A
Ensure boundary signing and fencing are adequate	Same as Alt. A	Same as Alt. A
Maintain inspection of units, on average 4 hours per week, particularly during hunting seasons.	Increase inspection of units, on average 8 hours per week, particularly during hunting seasons.	Same as Alt. B.
Share a law enforcement officer with the McGregor District of UMRNWFR.	Same as Alt. A	Same as Alt. A
Maintain contact with Refuge neighbors at current levels	Same as Alt. A	Increase contact with landowners adjacent to the Refuge to prevent impacts from grazing, logging, invasive species, erosion, and sinkhole filling. Specifically, use USDA programs, Partners for Fish and Wildlife program, or endangered species funding to reduce erosion impacts to the Fern Ridge and Cow Branch units.
Remove garlic mustard from algific slopes at the Howard Creek Unit.	Remove garlic mustard from lands surrounding algific slopes, but not on the slopes themselves to reduce disturbance.	Remove all garlic mustard from algific slopes on the Howard Creek and Lytle Creek units in ways that minimize disturbance. Expand garlic mustard control efforts in surrounding habitats on all units.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
Monitor Iowa Pleistocene snail and Northern monkshood populations (on Refuge and other public and private lands) at 2004 levels to measure population trends for recovery and as an indicator of habitat condition.	Monitor Iowa Pleistocene snail and Northern monkshood populations (only on Refuge) every three years to measure population trends for recovery and as an indicator of habitat condition.	Same as Alt. A.
Monitor soil/vent temperatures on select algific talus slopes.	Same as Alt. A.	Same as Alt. A.
		Determine impacts of shade on algific talus slopes, particularly in regard to Northern monkshood. Complete study by 2010. This will aid in determining the best restoration alternative adjacent to algific slopes.
		Add a wildlife biologist to the staff.
Objective 2. Restore existing 40 acres of grassland to a mixture of at least 25 species of local genotype grasses and forbs by 2009.	Objective 2. Restore existing 40 acres of grassland on the Howard Creek unit to a mixture of at least 25 species of local genotype grasses and forbs by 2009.	Objective 2. Restore existing 40 acres of grassland on the Howard Creek unit to a mixture of at least 25 species of local genotype grasses and forbs by 2009.
Strategies:	*Strategies:*	*Strategies:*
Use fire and other techniques to control invading woody vegetation on remnant and restored prairies.	Same as Alt. A.	Same as Alt. A.
Use biological, chemical, and mechanical controls as time allows to control invasive species on other habitats.	Same as Alt. A.	Same as Alt. A.
Partner with local groups to restore prairie and possibly create demonstration areas.	Same as Alt. A.	Same as Alt. A.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
Plant a mixture of native grasses and forbs (local genotype)	Same as Alt. A.	Same as Alt. A.
Objective 3. Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2020.	Objective 3. Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2020.	Objective 3. Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2012.
Strategies:	*Strategies:*	*Strategies:*
Plant 48 acres of native forest on the Fern Ridge and Howard Creek units and implement forest management plans for existing forests on the Fern Ridge and Bankston units during the life of the plan.	Let natural succession occur.	Plant 116 acres of native forest on the Pine Creek, Fern Ridge, and Howard Creek units
Let natural succession occur on areas that are not actively planted.		Develop partnerships with local groups to restore forests and evaluate feasibility of establishing reforestation demonstration areas.
		Inventory exotic invasive species and develop plans for control on each unit.
		Write habitat management plans for each Refuge unit and implement forest management plans for existing forests on the Fern Ridge and Bankston units during the life of the plan.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
Objective 4: Working with others, permanently conserve 1000 additional acres of endangered species habitat above the 2004 level to contribute to recovery goals for the Iowa Pleistocene snail, Northern monkshood, and Leedy's roseroot.	Objective 4: Permanently conserve 3200 additional acres of endangered species habitat above the 2004 level to reach this recovery goal for the Iowa Pleistocene snail and contribute to recovery goals for Northern monkshood and Leedy's roseroot by 2020.	Objective 4: Permanently conserve 2200 additional acres of endangered species habitat above the 2004 level to achieve this recovery goal for the Iowa Pleistocene snail, and contribute to recovery goals for Northern monkshood and Leedy's roseroot by 2020.
Strategies:	*Strategies:*	*Strategies:*
Maintain current contact frequency with landowners with aid of TNC, INHF, summer interns to maintain integrity of sites and identify willing sellers.	Same as Alt. A.	Same as Alt. A.
Assist partners secure funding and conserve sites through a variety of means such as ESA Section 6 funding, land trust conservation easements, USDA programs, and fund raising.	Acquire additional land adjacent to Refuge sites where the algific slopes or sinkholes are not under permanent conservation.	Same as Alt. B.
	Protect an additional 40 snail and monkshood sites through acquisition, easement, or other means.	Protect an additional 20 snail and monkshood sites
	Acquire any of the three Leedy's roseroot sites that become available	Same as Alt. B.
	Seek consistent annual Land and Water Conservation Fund appropriations to meet the objective.	Same as Alt. B.
	Work with partners to secure funding and protect sites through a variety of means such as ESA Section 6 funding, land trust conservation easements, USDA programs, fund raising, and congressional appropriations.	Same as Alt. B.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
	Prioritize sites for protection and prepare site preservation plans in GIS format with state and TNC input.	Same as Alt. B.
	Protect sites through conservation easements and fee title acquisition.	Same as Alt. B
	Objective 5: Permanently conserve 200 additional acres of habitat above the 2004 level to preclude listing of glacial relit species of concern by 2020	Objective 5: Permanently conserve 75 additional acres of habitat above the 2004 level to begin protection of glacial relict species of concern by 2020.
	Strategies:	*Strategies:*
	Protect 5 sites for other Service species of concern.	Protect 3 sites for other species of concern.
	Maintain contact with landowners with aid of TNC, INHF, summer interns to maintain integrity of sites and identify willing sellers.	Same as Alt. B.
	Protect sites through conservation easements and fee title acquisition.	Same as Alt. B.
Species Management Goal: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.		
	Objective 1: Identify and evaluate new algific slopes in the Driftless Area for the presence of threatened and endangered species and species of concern within 3 years of plan approval.	Objective 1: Identify and evaluate new algific slopes in the Driftless Area for the presence of threatened and endangered species and species of concern within 3 years of plan approval.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
	Strategies:	*Strategies:*
	Review existing algific slope records to identify potential new survey locations.	Same as Alt. B
	Actively search areas that may have been underrepresented in original surveys. Survey any new locations for Iowa Pleistocene snail and Northern monkshood.	Same as Alt. B
	Seek assistance from Partners to provide funding or people to accomplish objective.	Same as Alt. B
		Objective 2: Establish the size of upland buffers needed to provide permanent protection of algific talus slopes by 2009.
		Strategies:
		Conduct winter surveys to locate sinkholes associated with algific slopes.
		Initiate studies to determine the function and association of sinkholes to cold air flow and hydrology.
		Objective 3: Gain a better understanding of plants and animals associated with algific talus slopes and similar habitats in the Driftless area.
		Strategies:
		Use experts to inventory snail, plant and insect species on six or more algific talus slopes within six years of plan approval.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
		Inventory birds on Refuge units to document habitat use
Objective 1: By 2008, determine the appropriate deer density and population structure for Refuge units that will safeguard habitat.		Objective 4: By 2008, determine the appropriate deer density and population structure for Refuge units that will safeguard habitat.
Strategies:		*Strategies:*
Use research or literature search to determine the appropriate deer density for Refuge units that will safeguard habitat.		Same as Alt. A.
Working with states, manage deer populations at a level and population structure that does not negatively impact algific slopes or associated habitats.		Same as Alt. A.
Objective 2: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.	Objective 2: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.	Objective 5: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.
Strategies:	*Strategies:*	*Strategies:*
Work with Ecological Services and applicable states to update and rewrite draft recovery plans.	Same as Alt. A	Same as Alt. A

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
Visitor Services Goal: Visitors understand and appreciate the role of the Refuge in protecting endangered species.		
Objective 1: Maintain wildlife-dependent recreation opportunities at levels offered in 2004.	Objective 1: Provide wildlife-dependent recreation opportunities at levels offered in 2004 and establish an upper level limit for visitation within 5 years of CCP approval.	Objective 1: Increase environmental education programs by 50 percent within 8 years of CCP approval, and establish a reliable system for documenting and monitoring public use within 5 years of CCP approval.
Strategies:	*Strategies:*	*Strategies:*
Howard Creek and Fern Ridge units open to upland game and white-tailed deer hunting.	Same as Alt. A.	Same as Alt. A.
Steeles Branch and Fern Ridge units remain open to fishing.	Same as Alt. A.	Same as Alt. A.
Howard Creek and Fern Ridge units remain open to wildlife observation and photography.	Same as Alt. A.	Same as Alt. A.
Maintain McGregor District Visitor Center as place of primary public contact.	Same as Alt. A.	Same as Alt. A.
Conduct off-site environmental education at 2004 levels of one to two programs per year.	Conduct off-site environmental education at 2004 levels.	Develop an information kiosk at the Fern Ridge unit by 2007.
Develop a Visitor Services Plan within 2 years of CCP approval.	Establish relationship between level of use and resource impacts within 5 years of plan approval.	Develop a wildlife observation trail at the Howard Creek Unit by 2008.
Continue to work with Friends of the Upper Mississippi River Refuges and include volunteers when possible.	Establish reliable system for documenting and monitoring public use within 2 years of plan approval.	Develop an interpretive display at McGregor District Visitor Center by 2007.
	Same as Alt. A.	Present to local school groups at least 10 environmental education programs per year, with an emphasis on endangered species.

Table 2: Comparison of Alternatives

Alternative A: Present Course of Habitat Protection and Limited Public use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation
		Share an interpretive park ranger with the McGregor District.
	Same as Alt. A for Friends and volunteers.	Same as Alt. A.
		Permit compatible wildlife-dependent recreation on newly acquired lands.
	Establish reliable system for monitoring public use within two years of plan approval.	Same as Alt. B.
	Establish relationship between level of use and resource impacts within 5 years of plan approval.	Same as Alt. B.
		Develop a volunteer program and continue to work with Friends of the Upper Mississippi River Refuges.

Chapter 3: Affected Environment

Algicific slope on a preserve of The Nature Conservancy.

3.1 Physical Environment

The namesake of the Refuge, the Driftless Area (Figure 1 on page 7), is a region characterized by a near absence of glacial deposits, or glacial drift, causing it to be named the 'Driftless Area' by early geologists. Its rugged, dissected terrain resulted from weathering and stream erosion of Paleozoic age limestone bedrock (Prior 1991). The karst topography with caves, coldwater springs and streams, hardwood forests, and the Upper Mississippi River valley set northeast Iowa apart from the rest of the state. Karst is a type of topography that is formed on limestone and other soluble rocks, primarily by dissolution from water. The Driftless Area also includes southeast Minnesota, southwest Wisconsin, and extreme northwest Illinois. Some portions of the Wisconsin Driftless Area are truly unglaciated. This area is one of the ecotypes identified in the U.S. Fish and Wildlife Service's Upper Mississippi River/Tallgrass Prairie ecosystem. Streams cutting into bedrock have created many cliffs and algific talus slopes which constitute habitat for a large number of plant species that are either unique to this area or well out of their normal ranges.

Northeast Iowa receives 32-34 inches of rainfall annually with a growing season ranging from 135 to 155 days. The Driftless Area is within the eastern broadleaf forest (continental) province identified by Bailey (1995). The Refuge lies within the Mississippi flyway.

3.2 Biological Environment

3.2.1 Habitat/Vegetation

The Refuge contains upland hardwood forests, grassland, stream and riparian habitat (Figures 6-14). The Refuge provides wildlife habitat similar to that in the remainder of the region where lands are not farmed. The driftless region is a transition zone between eastern hardwood forests and midwestern tall grass prairies. Vegetation classifications for northeast Iowa vary (Cahayla-Wynn and Glenn-Lewin 1978). Glenn-Lewin et al. (1984) describe it as a dynamic area where vegetation probably never has been in a climax state. Historic habitats range from tallgrass prairie and savanna to maple/basswood and oak/hickory forest and riparian areas (Kemperman 1983, Glenn-Lewin et al. 1984). The presettlement forest was primarily oak (Glenn-Lewin et al. 1984). Fire was a natural part of the Driftless Area ecosystem, maintaining prairie and savanna. Because of the karst geology, wetland habitats are not predominant except along streams and rivers.

Currently, despite the terrain, row crop and livestock agriculture is common. Prairie and savanna areas were converted to row crop or pasture and few unaltered native vegetation remnants exist. Patches of forest were cleared for agriculture, but the more rugged areas still support hardwood forest. Logging, grazing, development, and fire suppression have impacted the remaining fragmented forests (Hemesath and Norris 1998). All forests on Refuge units were selectively logged at some time in the past; most within the last 30 years. Most Refuge forests were also subject to grazing. Invasive species occurring on the Refuge include garlic mustard, multiflora rose, leafy spurge, wild parsnip, Canada thistle, European buckthorn, and honeysuckle.

3.2.2 Algific Talus Slopes

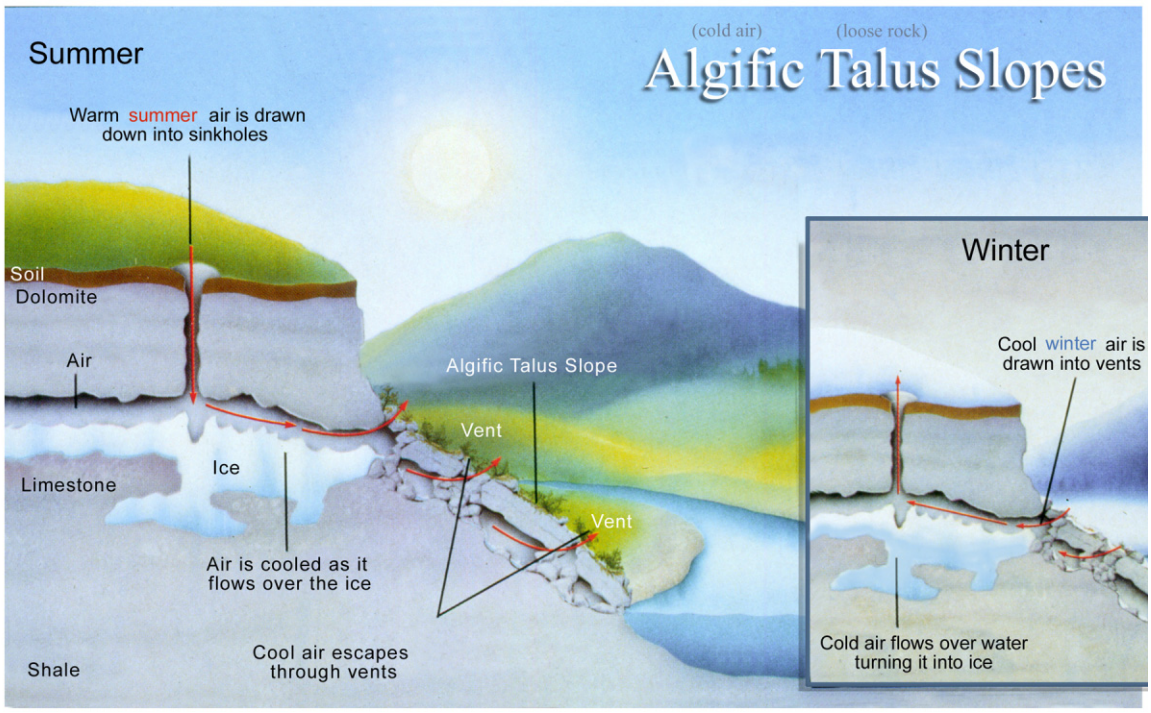
Cold air vent on an algific talus slope with the rare plant golden saxifrage growing near it. USFWS

The habitat of the Iowa Pleistocene snail and Northern monkshood and other rare species is the algific talus slope. This habitat, usually north facing, occurs where air circulation over underground ice produces a constant stream of moist cool air through vents onto the adjacent hillsides (Figure 19). These cold air vents are typically covered with a loose talus layer and a thin plant and litter cover. Some of these species, like Leedy's roseroot, occur on maderate cliffs. This is a similar habitat, where the overlying talus layer does not exist, generally because of removal by past erosive forces. Only the (now exposed) rock formation remains. Cool subsurface air flows out from the cliff face. Algific talus slopes and maderate cliffs vary in size from a few yards to one-half-mile in length. Sinkholes above the slope are important to the function of the habitat as a source of air and water flow and are included in Refuge protection when possible. Several sinkholes are usually associated with algific talus slopes and can be up to one-half mile away. Air flowing from surface vents ranges from 30 degrees F to 55 degrees F spring to fall (U.S. Fish and Wildlife Service 1984).

The vegetative community on algific talus slopes is different than the surrounding forest and typically contains ferns, mosses, liverworts, evergreen species such as Canada yew and balsam fir, birch, basswood, and sugar maple, and boreal disjunct herbs and ferns (Glenn-Lewin et al. 1984). The algific talus slopes also harbor state threatened and endangered plants and animals (Appendix C) and in general support an entire community of rare or disjunct species. Algific talus slopes are ranked by NatureServe as a G2 community meaning that they are imperiled globally because of rarity. Service species of concern that occur on algific slopes include eight species of glacial relict snails*: Vertigo meramecensis*, *V. brierensis*, *V. iowensis*, *V. hubrichti*, *V. occulta*, *Catinella gelida*, *Novisuccinea Sp* A and *Sp* B. Some or all of these species are also listed by state law as threatened or endangered in Iowa, Illinois, Wisconsin, and Minnesota (Appendix C). Golden saxifrage (*Chrysosplenium iowense*) is a plant associated with algific slopes that is listed as threatened by Iowa and Minnesota and is included in the Service's draft species of concern list.

Most of the original inventories of algific talus slopes were done by Frest (1982, 1983, 1985, 1986, 1987). There are nearly 400 known algific slopes/maderate cliffs in the Driftless Area (Figure 20). Not every site contains the above species. Some sites have never been thoroughly surveyed for these species, particularly for snails. Although original surveys to locate this habitat type were systematic and comprehensive, some sites likely remain undiscovered.

Figure 19: Algific Talus Slope Diagram[1]



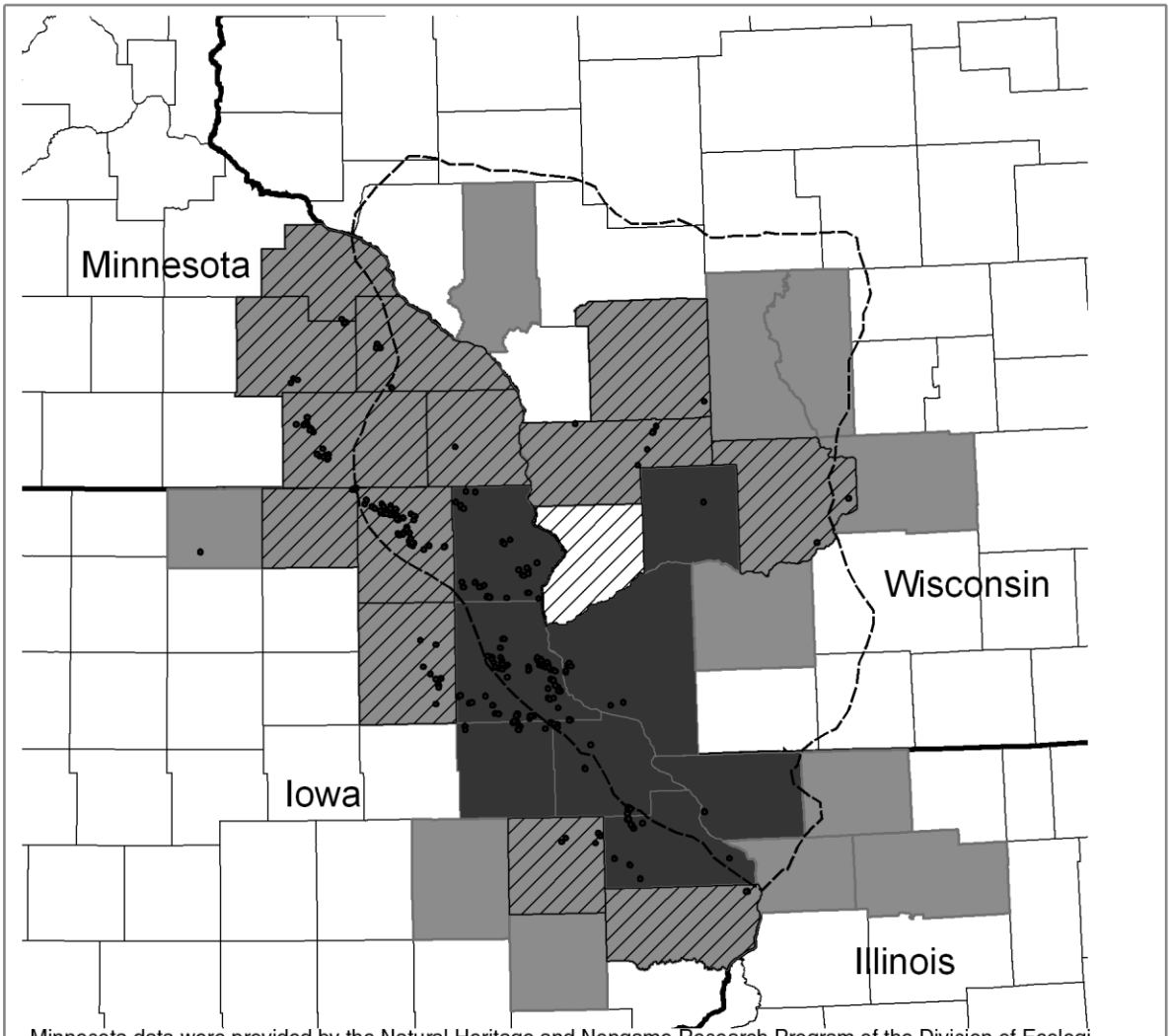
1.Courtesy of The Nature Conservancy

3.2.3 Wildlife

U.S. Fish and Wildlife Service Region 3 migratory non-game birds of management concern that may occur on the Refuge are Northern harrier, red-shouldered hawk, yellow-billed cuckoo, red-headed woodpecker, Northern flicker, sedge wren, veery, wood thrush, loggerhead shrike, blue-winged warbler, golden-winged warbler, chestnut-sided warbler, cerulean warbler, dickcissel, field sparrow, grasshopper sparrow, bobolink, eastern meadowlark. In addition to most of the above, Region 3 resource conservation priority bird species that occur in northeast Iowa, and likely on the Refuge, are Wood Duck, Mallard, Blue-winged Teal, American Woodcock, Black-billed Cuckoo, Whip-poor-will, Louisiana Waterthrush, and Kentucky Warbler (U.S. Fish and Wildlife Service 2002). Many other migratory birds such as Mourning Dove, American Robin, Eastern Bluebird, Red-bellied Woodpecker, Pileated Woodpecker, Song Sparrow, Common Yellowthroat, Red-eyed Vireo, Brown Thrasher, Yellow Warbler, Common Grackle, Red-tailed Hawk occur on the Refuge. The Partners in Flight Bird Conservation Plan for the Upper Great Lakes Plain (Knutson et al. 2001) identifies priority bird populations and habitats. Some of the following priority species do occur, or likely occur, on the Refuge: Dickcissel, Bobolink, Red-headed Woodpecker, Blue-winged Warbler, Field Sparrow, Black-billed Cuckoo, Cerulean Warbler, Acadian Flycatcher, Kentucky Warbler, Prothonotary Warbler (Hemesath and Norris 1998).

Notable resident wildlife include white-tailed deer, Wild Turkeys, Ruffed Grouse, Ring-necked Pheasant, coyotes, numerous small mammals, and timber rattlesnakes. Predators may be important in the context of impacting breeding birds on the Refuge. Trout species occurrence on the Refuge is currently limited. Declines in timber rattlesnakes are of concern to some state agencies and they are

Figure 20: Algific Talus Slopes Target Species Occurrences in the Driftless Area



Minnesota data were provided by the Natural Heritage and Nongame Research Program of the Division of Ecological Services, Minnesota Department of Natural Resources, and were current as of January 2004. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. In addition, there may be inaccuracies in the data, of which the DNR is not aware and for which the DNR shall not be held responsible. Permission to use these data does not imply endorsement or approval by the DNR of any interpretations or products derived from the data.

Legend

The Driftless Area

Target Species Occurrences/Potential Acquisition Sites

2004 Proposed Expansion

1993 Proposed Expansion (PPP)

Original Acquisition Boundary

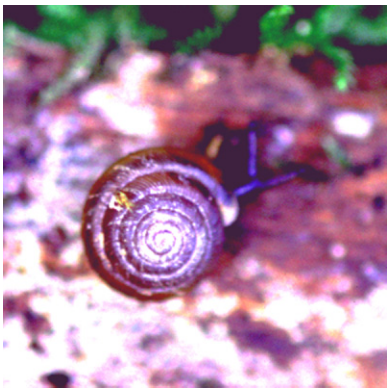
1:3,000,000

N W E S

30 15 0 30 60 90

Miles

listed as threatened by the State of Minnesota and are a Resource Conservation Priority species for the Service. Although they have not been seen on the Refuge, they likely occur and may occur on lands acquired in the future.



Iowa Pleistocene snail. Bob Clearwater

3.2.4 Threatened and Endangered Species

Fossil records show that the Iowa Pleistocene snail existed 400,000 years ago and was widespread in the Midwestern United States. It was thought to be extinct until discovered in Iowa in 1928. It was listed as federally endangered in 1977. It is also listed by state law as endangered in Iowa and Illinois. The Iowa Pleistocene snail is a relict species that has survived on these small areas of suitable habitat and is currently known to exist at 36 locations in Iowa and one in Illinois. The snail has narrow temperature, moisture and food requirements found only on algific talus slopes (Frest 1984). Adult shell diameter is 5-7 mm. Populations on each of the known sites vary from 500 to 10,000 individuals. Each snail colony is a separate population as migration between algific slopes is unlikely, though could occur with flood events or transport by other animals (Ross 1999). Other glacial relict snails also appear to be restricted to algific talus slope or maderate cliff habitat and presumably cannot withstand even moderate changes in their environment (Frest 1991).

Northern monkshood was listed as federally threatened in 1973. It is also state listed as threatened in Iowa, Wisconsin, and New York, and endangered in Ohio. It does not occur in any other states, and the majority of the known populations occur in Iowa. There are 83 known sites in Iowa, 18 in Wisconsin, two in New York, and one in Ohio. Population sizes range from a few individuals to 10,000 plants. Most sites have a few hundred to 1,000 plants. Northern monkshood is a member of the buttercup family (*Ranunculaceae*) and grows on cool moist habitat including algific talus slopes and sandstone cliffs. Currently all monkshood sites on the Refuge are algific talus slopes. The plant requires specific temperature and moisture regimes (U.S. Fish and Wildlife Service 1983). Its hood shaped flower is adapted for bumblebee pollination and is typically purple in color, but can vary from white to blue and purple.

Leedy's roseroot does not currently occur on the Refuge, but future additions to the Refuge may be for the purpose of protecting this species. Leedy's roseroot was listed as threatened in 1992 and is a member of the stonecrop family (Crassulaceae). It grows on cool cliff habitats only in southeast Minnesota and New York. The four Minnesota populations each contain a few hundred plants. It has waxy, succulent leaves with small dark red to yellow flowers arranged in dense heads at the end of the stem. Male and female flowers occur on separate plants.

The only federally threatened or endangered bird occurring on the Refuge is the Bald Eagle, recently proposed for delisting. There are no known eagle nests on the Refuge.

3.3 Soil and Water

Soils vary because Refuge units are scattered over a large area. Most of the soils are forest derived. Some savanna and prairie soils occur, mainly on the Howard Creek unit. All of the units contain some rock outcroppings or cliffs, and rocky soils. Soils are generally erodible. Water sources are from springs and streams on, or adjacent to, the Refuge units. The primary contaminant sources are from nonpoint source runoff from adjacent agricultural fields that could contain excess nutrients and pesticides. Runoff may contaminate sinkholes and groundwater in addition to surface water. Water

quality on the Refuge has not been tested. A contaminant assessment of the Refuge is being completed by the Service's Division of Ecological Services.

3.4 Public Use

Public use is currently minimal since most units are closed to protect endangered species or because access is limited. On two Refuge units that are open, most visitation is during the hunting season. Most users are bow hunting for deer. There were 2,741 visitors in FY 2003. This figure includes visitors to the McGregor District Visitor Contact Station.

3.5 Cultural Resources

The uplands, floodplains, and tributaries of the driftless area offered a variety of resources to prehistoric populations. The area has a cultural history of 11,500 years with the Paleo-Indian peoples. Archeologists hypothesize that small family-groups of hunters-gatherers roamed widely in search of mega-fauna and other resources. The presence of these people is usually recognized through surface finds of their fluted spear points; none of these points have been identified within the Refuge.

People of the 6,000-year long Archaic tradition adapted their subsistence practices to changing environmental, habitat, and resources based changes including the 2,000-year very warm and dry altithermal that ended about 5,000 years ago. Extensive trade routes brought in exotic materials. People buried their dead in natural knolls. Archaic tradition cultural practices gradually evolved into the subsequent Woodland tradition.

Commencing around 3,000 years ago was the Woodland tradition. Archeological sites usually include pottery, arrowheads, and artificial mounds used for human burials and for other purposes. People exploited a wide range of habitats in an environment similar to that found in the early historic period. The people lived in larger, semi-permanent villages, practiced horticulture, and at some period participated in long distance trade. In some respects, Europeans coming into the Upper Mississippi River valley encountered people of the Woodland culture, some of whom may have been the ancestors of the Eastern Dakota Indians.

The Mississippian period started in the Saint Louis area about 1,000 years ago and moved up the Mississippi River. A related cultural group known as the Oneota, which may have developed from the Late Woodland culture, is more evident in the archeological record. Late Oneota people probably were the ancestors of the Ioway, Oto, Missouria, and Winnebago Indian tribes.

Twenty-seven previously identified archaeological sites are located within one mile of the 17 units studied by Commonwealth Cultural Resources Group in 2002. These study units included current Refuge lands and areas of potential Refuge acquisitions. Twenty-two of these sites are prehistoric and one is a multi-component prehistoric and protohistoric site, one includes both prehistoric and historic components, and three are historic sites. The majority of prehistoric sites cannot be assigned to a specific period.

The following listed Indian tribes have been recognized by the federal government or self-identified by the tribe as having a potential concern for traditional cultural resources, sacred sites, and cultural hunting and gathering areas in the counties in which the Refuge is located.

- Delaware Nation of Oklahoma
- Flandreau Santee Sioux

- Forest County Potawatomi Community
- Hannahville Indian Community of Michigan (Potawatomi)
- Ho-Chunk Nation of Wisconsin
- Iowa Tribe of Kansas and Nebraska
- Iowa Tribe of Oklahoma
- Osage Nation of Oklahoma
- Otoe-Missouria Tribe
- Peoria Indian Tribe of Oklahoma
- Sac & Fox Tribe of the Mississippi in Iowa
- Sisseton-Wahpeton (Sioux) Oyate
- Devils Lake Sioux Tribal Council
- Upper Sioux Community of Minnesota
- Winnebago Tribe of Nebraska
- Wyandotte Tribe of Oklahoma

Although Indian tribes are generally understood to have concerns about traditional cultural properties, other organizations such as church congregations, civic groups, and county historical societies could have similar concerns.

A cultural resources overview and management study was prepared in 2002 as part of the Comprehensive Conservation Plan for the Refuge (Commonwealth Cultural Resources Group 2003). The document is available at the Refuge office, McGregor, Iowa. The report presents a cultural history beginning 11,500 years ago through prehistoric and historic periods, ending in the 20th century. Current Refuge lands as well as potential acquisition areas were evaluated for the presence of archeological sites. Two historic sites were located on the Refuge units. The location of reported prehistorical and historic archeological sites within one mile of the Refuge units, and analysis of geomorphological data indicates high potential for unrecorded sites on most Refuge units. The document has a chapter about consultation processes identified in the National Historic Preservation Act of 1966 as amended, and a chapter that summarizes the responses to a letter sent to over 100 tribal communities, historical societies, and research groups who have potential interest in resources on the Refuge. The report concludes that a variety of cultural resources must be considered during any field projects associated with the Refuge. A comprehensive bibliography of cultural resources reports produced for studies performed within the vicinity of the Refuge is also included. Finally, a chapter on management of cultural resources under Section 106 of the National Historic Preservation Act is provided for use in Refuge management.

Cultural resources are an important part of the nation's heritage. The U.S. Fish and Wildlife Service is committed to protecting valuable evidence of human interactions with each other and the landscape. Protection is accomplished in conjunction with the U.S. Fish and Wildlife Service's mandate to protect fish, wildlife, and plant resources.

3.6 Fire

Wildfires in northeast Iowa are primarily from human caused road ditch fires that escape. Prescribed fire is used regularly on the Refuge as a habitat management tool. Periodic burning of grasslands reduces encroaching woody vegetation such as box elder. Fire also encourages the growth of desirable species such as native, warm-season grasses and forbs. Prescribed fires on the Refuge have only occurred on the Howard Creek unit and range from 10 to 60 acres depending on the goal of the burn. Burning does not occur every year. Prescribed fire may be used on other units in the future.

3.7 Socioeconomic Environment

The economy of communities near the Refuge lands are primarily based on farming with some industry and tourism jobs. Crops are mainly corn and soybean with beef and dairy cattle operations occurring in the area. Some timber harvest also occurs. Most communities in the area are under 10,000 people. The largest community is Dubuque, Iowa with a population of about 70,000.

3.8 Refuge Staff and Budget

The annual Refuge operations budget for fiscal year 2004 was $92,285 which includes salary for one Refuge Operations Specialist (GS 9). The Refuge receives administrative, law enforcement, and maintenance support from the McGregor District of Upper Mississippi River National Wildlife and Fish Refuge. Volunteers also assist with Refuge activities.

Chapter 4: Environmental Consequences

Bumblebee pollinating Northern monkshood. Terry Tracy

4.1 Introduction

The actions identified in the EIS are for the protection and restoration of wildlife habitat, with emphasis on endangered species recovery. The consequences of each alternative are evaluated in terms of listed species, refuge expansion, habitat and habitat management, wildlife-dependent recreation, and other rare species. Water quality and soils, economic effects, and cumulative effects are also evaluated in this chapter.

The small size and primarily protective purpose of the Refuge result in relatively minor overall adverse environmental consequences. The primary consequences as they relate to Refuge purposes (reaching recovery and delisting target species) are: Alternatives A and B are not likely to meet sufficient recovery goals for delisting of any of the species; Alternative C would meet multiple recovery goals for delisting of the Iowa Pleistocene snail.

4.2 Issues/Impacts Common to all Action Alternatives

Endangered species habitat remains closed to all public entry. Cultural resources are treated the same as under current management and are fully protected. Some level of habitat restoration would occur under each alternative that would include the use of prescribed fire.

4.2.1 Prescribed Fire

Prescribed fire would be used as a management tool under all alternatives according to the current Refuge fire plan.

4.2.1.1 Social Implications

A prescribed burn on the Refuge will benefit the public by maintaining or increasing recreational opportunities through increased wildlife populations for hunting and observation.

Smoke from a Refuge fire could impair visibility on roads and become a hazard. All efforts will be taken to assure that smoke does not impact smoke sensitive areas such as roads and local residences.

Combustion of fuels during prescribed fire operations may temporarily impact air quality, but the impacts are mitigated by small burn unit size, direction of wind, and distance from population centers.

Any smoke from the Refuge may cause some public concern. This concern will be reduced through a concerted effort by Refuge personnel to inform the local citizens about the prescribed burning program, emphasizing the benefits to wildlife and the safety precautions that are taken. Interpretive programs, explaining the prescribed burning program, may also be conducted on and off the Refuge. The Refuge has a portable fire exhibit designed to inform the public about the benefits of prescribed fire in habitat management.

In general, local public attitude toward fire is positive. In fact, during the spring or fall smoke is a familiar part of the surrounding landscape from brush or road ditch fires initiated by local property owners.

4.2.1.2 Cultural and Archaeological Resources

There may be archaeological sites within prescribed burn units. When these units are burned, it is doubtful that the fire will have any adverse impact on the sites. The fire will be only a temporary disturbance to the vegetation in the area and likely will not destroy or reduce the archaeological value, since artifacts are typically buried beneath the surface. No known sites will be impacted by prescribed burning operations.

Constructing firebreaks usually involves some shallow ground disturbance that could damage or destroy archeological resources. If a firebreak is needed on previously undisturbed ground, the area will be surveyed prior to construction to avoid or protect any cultural or archaeological resources.

4.2.1.3 Flora

The prescribed burning program will have a visible impact on vegetation and the land. Immediately after a fire much of the land will be blackened. There will be few grasses or ground forbs remaining and most of the brush will be scorched. Trees may be scorched. Because of wet ground conditions or discontinuous fuel, there may be areas within the burn unit that are untouched by the fire.

In spring, grasses and forbs will begin to grow within a few days of the burn. The ash enriched soil will promote rapid growth such that after two or three weeks the ground will be covered. In some cases, young trees will re-sprout. Some of the less fire resistant trees will show signs of wilting and may succumb. After one season of regrowth, most signs of the prescribed burn will be difficult to detect without close examination.

Other signs of the burn will remain for longer periods. The firebreaks may still be visible. Vehicle tracks through the burn are visible on the freshly burned ash and may be longer lived if the vehicle created ruts in the ground. The long-term visibility of tracks will be reduced through procedures described in Chapter 2.

4.2.1.4 Listed Species

There will be no impacts to listed species because of precautions described in Chapter 2.

4.2.1.5 Soils

The effect of fire on soil is dependent largely on the fire intensity and duration. On areas with high fuel loads, a slow backing fire is usually required for containment and desirable results. The intense heat generated by a slow backing fire will have a greater effect on the soils than fast, cooler head-fires. The cool, moist soils of wetter areas in the burn units or areas with little fuel will be minimally affected by the fire.

The degree of impact to the soil is a function of the thickness and composition of the organic mantle. In cases where only the top layer of the mantle is scorched or burned, there will be no effect on the soil. This usually occurs in the forested areas.

On open grassland sites, the blackening of the relatively thin mantle will cause greater heat absorption and retention from the sun. This will encourage earlier germination during the spring growing season.

Nutrient release occurs as a result of the normal decomposition process. Fire will speed up the nutrient release process. The rate and amount of nutrients released will be dependent on the fire duration and intensity as well as the amount of humus, duff and other organic materials present in the mantle. The increase, immediately after a burn, of calcium, potash, phosphoric acid and other minerals will give the residual and emergent vegetation a short-term boost.

There is no evidence to show that the direct heating of soil by a fire of low intensity above it has any substantial adverse affect. Fire of this type has little total effect on the soil, and in most cases would be beneficial.

4.2.1.6 Escaped Fire

The possibility exists that prescribed fire may escape to the surrounding area. An escape can be caused by factors that may, or may not, be preventable. Inadequate firebreaks, too few personnel, unpredicted changes in weather conditions, peculiar fuel type, inadequate planning, and insufficient knowledge of fire behavior are factors that can lead to a loss of control. An escaped fire can turn into a very serious situation. On the Refuge's wildlands, an escaped fire would cause less severe damage than on land where buildings, equipment, and land improvements could be damaged. Many of the prescribed burn areas are well within the Refuge and of minimal threat to private or other improved lands. We will exercise extreme care, careful planning, and adherence to the unit prescription when we conduct all prescribed burns.

4.2.2 Environmental Justice

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Bill Clinton on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment.

None of the alternatives disproportionately place an adverse environmental, economic, social, or health impact on minority or low-income populations.

4.2.3 Cultural Resources

Activities outlined in each alternative have the potential to impact cultural resources, either by direct disturbance during habitat projects or construction of facilities related to public use or administration and operations, or indirectly by exposing cultural and historic artifacts during management actions such as prescribed burning. Although the presence of cultural resources including historic properties cannot stop a federal undertaking, the undertakings are subject to Section 106 of the National Historic Preservation Act, and at times, other laws.

Thus, the Refuge will, during early planning of actions, provide the Regional Historic Preservation Officer a description and location of all projects, activities, routine maintenance and operations that affect ground and structures, details on requests for allowable uses, and the range of alternatives being considered. The regional officer will analyze these undertakings for their potential to affect

historic properties and enter into consultation with the State Historic Preservation Officer and other parties as appropriate. The Refuge will notify the public and local government officials to identify concerns about impacts by the undertaking. This notification will be at least equal to, but preferably with, the public notification accomplished for NEPA compliance and compatibility determinations.

4.2.4 Climate Change

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's "Carbon Sequestration Research and Development" (U.S. DOE, 1999) defines carbon sequestration as A...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere. Conserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions considered in this EIS would conserve or restore land and water, and would enhance carbon sequestration. This would contribute positively toward efforts to mitigate human-induced global climate changes.

Conversely, climate change has the potential to negatively affect Refuge resources. Climate change may affect the endangered species habitat we are seeking to conserve on this Refuge. The species the Refuge seeks to conserve depend on cold microclimates that are dependent on outflows of air resulting from underground ice. Global warming may cause this ice to melt more than usual and freeze less in the winter, thereby reducing or eliminating the permanent ice in the system. Loss of this ice would eliminate algific talus slopes and associated species. All three alternatives include monitoring of soil temperatures on a sample of algific slope habitats. Global warming may also cause an increased frequency of high rainfall events that can cause local flooding and erosion of habitats.

4.3 Alternative A: No Action

4.3.1 Impacts on Resources

4.3.1.1 Listed, Proposed, and Candidate Species

Under this alternative, recovery of the target listed species according to current recovery plans would not occur because there would be insufficient protection of current Refuge sites or of additional sites. Other recovery tasks also would not be accomplished. This alternative may also lead to possible listing of species of concern associated with algific talus slopes because of the lack of protection. There may be a greater chance of unauthorized uses that disturb endangered species habitat because of infrequent law enforcement patrol. Private landowner contacts would still occur as staff time allows. This alternative does continue to work towards recovery goals, but they will not be met in the near future with current management.

4.3.1.2 Refuge Expansion

No Refuge expansion would occur under this alternative. Recovery of the target listed species would not occur without further permanent protection of habitat. Although Refuge partners may be able to protect some sites in the next 15 years, their current funding levels suggest that the amount of protection would be insufficient to reach recovery goals. Partners also would not have the personnel or funding to manage endangered species sites to meet other recovery goals to allow delisting.

4.3.1.3 Habitat

Minimal habitat restoration would occur under this alternative which may result in undesirable habitat, such as box elder groves, for other Service trust resources and other wildlife. Desirable habitat would take much longer to develop. Lack of, or reduced, restoration effort could also affect algific talus slopes by shading, sinkhole erosion, and increase of invasive species. Invasive species control would be minimal which could threaten endangered species habitat as well as other wildlife habitat.

4.3.1.4 Wildlife-Dependent Recreation

Current public uses would continue. There would be no change in public support for the Refuge mission and no increase in public opportunities. There may be a slight increase in public use from increased local knowledge and demand of the current opportunities over time. No environmental education would take place except as staff time allows. There may therefore be fewer human impacts to habitat under this alternative, but also static or reduced understanding and support for endangered species protection. The current regulations and level of use create a quality experience for Refuge visitors.

4.3.1.5 Other Rare Species

With no evaluation, investigation, or further protection of algific slopes, the threats to other species associated with this habitat may increase. There may then be the potential for future listing as threatened or endangered. There would also be a loss of general biodiversity and scientific information about other species and possible insights into the geology and cold conditions these species evolved with.

4.4 Alternative B: Habitat Protection Emphasis

4.4.1 Impacts on Resources

4.4.1.1 Listed, Proposed, and Candidate Species

Alternative B would address the permanent protection recovery goal for all three species by maximizing acquisition. Enough sites could be protected to meet Iowa Pleistocene snail recovery goals by increasing land acquisition. More sites would be protected for Northern monkshood than in Alternative C. This alternative would preserve more sites for species of concern than the other alternatives. Although minimizing management activity on algific slopes would ensure protection of the physical environment of endangered species habitat, it would not address the overall biological integrity, diversity and environmental health of algific slopes that includes sinkholes and surrounding habitat, nor would it address threats to algific slopes resulting from adjacent land use.

This alternative does not adequately address multiple recovery goals, such as habitat restoration and invasive species, that would provide permanent habitat protection for delisting. If other threats are not addressed in the next 15 years, they could become more difficult to achieve.

4.4.1.2 Refuge Expansion

Expansion of the Refuge by 3,400 acres would allow significant progress towards the primary recovery goals for permanent protection of endangered species habitat and would likely meet that goal for the Iowa Pleistocene snail. Habitat for species of concern would also be protected. However, additional recovery goals for delisting will not be reached with only land acquisition. With Refuge resources primarily going to land acquisition under Alternative B, it would be difficult to complete habitat management and restoration for other wildlife on the Refuge.

Additional land acquisition or other forms of protection would not only preserve endangered species, but also soils, water quality, aesthetic features, and wildlife habitat. The Driftless region is a

beautiful area with tourism popular in some locations. There has been a recent increase in land sales to private owners solely for recreation. There has been a coinciding increase in land values in recent years.

The Driftless region also contains karst geology that is sensitive to land uses. Groundwater is directly linked to surface water because of subsurface fractures and is easily contaminated. Soils are shallow and erodible. Some of the underground systems associated with karst can have specialized ecosystems that deserve protection in themselves. In short, lands set aside for the Refuge in this region also promote protection of other unique and fragile resources. Refuge lands may promote stewardship of natural resources by others. There may be increased public and local government support in an increased federal land acquisition program in some areas.

4.4.1.3 Habitat

Minimal habitat restoration would occur under Alternative B with just forty acres of grassland actively restored. The result may be undesirable habitat for other Service trust resources and other wildlife. Any desirable habitat would take much longer to develop. This could also affect algific talus slopes by shading, sinkhole erosion, and increase of invasive species. Invasive species control would be minimal which could threaten endangered species habitat as well as other wildlife habitat. Threats from adjacent lands, such as erosion, would not be adequately addressed.

4.4.1.4 Wildlife-Dependent Recreation

There would be no change in public support for the Refuge mission and no increase in public use opportunities for wildlife-dependent recreation. There may be a slight increase in public use from increased demand and increased local knowledge of the current opportunities over time. Public use would be monitored. Newly acquired lands would remain closed to public use.

4.4.1.5 Other Rare Species

There would be some new protection for other glacial relict species by expanding the Refuge boundary. However, with no evaluation or management of lands adjacent to algific slopes, the threats to other species associated with this habitat may increase. There may then be the potential for future listing as threatened or endangered. There would also be a loss of scientific information and insights into the geology and cold conditions these species evolved with because of no additional study.

4.5 Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-dependent Recreation (Preferred Alternative)

4.5.1 Impacts on Resources

4.5.1.1 Listed, Proposed, and Candidate Species

Delisting of the Iowa Pleistocene snail could occur by addressing multiple recovery goals with this alternative. Increased land acquisition in both Alternative B and Alternative C will be a very important component for reaching delisting. However, delisting will not occur without insurance of permanent protection and management of surrounding habitat. New information and threats since the Iowa Pleistocene snail recovery plan was written increase the need for more active management to meet multiple recovery goals. Because of the resources required to reach delisting, the Refuge cannot meet all recovery goals for all three species in the next 15 years. Therefore, this alternative includes only enough land acquisition to delist the Iowa Pleistocene snail so that Refuge resources can also be used for more active management of habitat. We focused on the snail because less acquisition is needed to reach recovery goals. In addition, there are only 37 total snail sites, making protection more critical than for monkshood where nearly three times as many sites exist. Work will still continue towards meeting recovery goals for the other species. Many of the recovery goals that

are addressed for the snail will also benefit Northern monkshood. Any of the three Leedy's roseroot sites that become available will be protected under Alternative C.

There may be slight increased risk physically to endangered species habitat due to monitoring activities. However, the benefit of the increased information would likely outweigh this. Without sufficient monitoring, information will likely not be available for a delisting decision. Measures would be taken to minimize activity on algific slopes during monitoring or study. The number of personnel would be limited, existing wildlife trails would be used for traversing slopes, monitoring would be only occasional and not on all sites, and sinkhole studies could be done in winter. Not all activities would occur on any one slope.

4.5.1.2 Refuge Expansion

Expansion of the Refuge by 2,275 acres would complete land acquisition needs for the Iowa Pleistocene snail and protect species of concern. Some of this acreage will also benefit Northern monkshood and Leedy's roseroot. Alternative C has less acreage identified for Refuge expansion than Alternative B. Therefore, limited Refuge resources can be used to acquire land as well as to address other recovery goals in order to delist the Iowa Pleistocene snail. If other recovery goals related to permanent protection of habitat are not addressed in the next 15 years, they could become more difficult to achieve. Although meeting the snail recovery goals will also benefit Northern monkshood, less land will be acquired for this species under Alternative C. Land values will likely continue to rise, making additional land acquisition more expensive in the future.

Other benefits of land protection are the same as given in Alternative B.

Sinkhole located on Driftless Area NWR. USFWS

4.5.1.3 Habitat

Habitat restoration surrounding algific talus slopes would benefit endangered species. Restoration can reduce erosion and invasive species impacts, and improve important microclimate factors (i.e. shade helps maintain cool temperatures). Not all impacts from neighboring land uses can be addressed through acquisition. Therefore, this alternative would better address issues such as nonpoint source runoff. This alternative would provide more beneficial habitat for other Service trust species, Resource Conservation Priority species, and other wildlife. Forty acres of grassland and 116 acres of forest would be restored. Additional restoration may occur on newly acquired sites. Alternative C fulfills the Service's policy of ensuring that the biological integrity, diversity, and environmental health of the Refuge System are maintained for Americans.

4.5.1.4 Wildlife-dependent Recreation

There could be increased public support for the Refuge mission under this alternative. There will be some increase in public use opportunities and information. A moderate increase in public use may increase the potential for wildlife impacts. However, the increase of on site activities would be minimal with just a trail added at the Howard Creek unit. Law enforcement patrols would increase. The primary increase in opportunities is from environmental education. An increase in environmental education, primarily off-site, would aid in support for acquisition efforts as well as

general understanding of endangered species in the area. Hunting may be needed to help control local deer populations, which are currently high. There could be the potential for impacts to other habitats if public use increases.

4.5.1.5 Other Rare Species

The objectives for increased inventory and review of information on other species would help ensure the protection of the entire rare community of algific talus slopes and may prevent future listing of other species, particularly snails. Scientific information on existing or even new species, on geology, and other features would meet the Refuge System goals for conserving a diversity of fish, wildlife, and plants and conserving representative ecosystems. There could be increased risk of impacts to the habitat from inventory work, mitigated by actions in Section 4.5.1.1. Work on algific talus slopes will only be done with stringent oversight and restrictions.

4.6 Water Quality and Soils

Most Refuge units contain streams and springs that have the potential to be impacted from nonpoint source runoff because of the karst topography. Water quality in northeast Iowa is generally affected by excess nutrients and pesticides as well as increased sediment loads. Refuge lands receive some runoff and soil erosion from agricultural fields. This runoff can affect sinkholes and streams to potentially affect endangered species habitat and general water quality. Runoff also affects general forest quality and loss of soil on the Refuge.

All of the alternatives protect Refuge lands from runoff and erosion, and improve soil retention and water quality in the local areas by setting land aside. Depending on surrounding land uses, runoff impacts to the Refuge could become worse under Alternative A. Alternative A has little emphasis on neighboring land uses, invasive species, or acquisition to protect buffer areas. Alternatives B and C provide more protection of land around algific slopes that would minimize these effects to endangered species and water quality. Alternative C also proposes more attention to work with adjacent landowners to minimize these effects through other programs. Study of sinkholes may also provide insight into nonpoint impacts to soil and water. Study of restoration options will assist in determining the best way to reduce threats from neighboring land uses.

4.7 Economic Effects of Alternatives

4.7.1 Refuge Expenditures

Approximately $11,050 of the Refuge budget were spent in a two county area on non salary items such as equipment, supplies, and fuel in FY2004. This amount would likely continue under Alternatives A and B and increase under the preferred alternative. More staff time and funds would be needed for Alternative C which adds a wildlife biologist position. An approximate 50 percent increase in operations funding would be needed to support an additional position. Funds for habitat restoration and studies would also be needed but could come from cooperative efforts with Refuge partners.

4.7.2 Wildlife-dependent Recreation

At least the current level of public use in the form of hunting, fishing, and wildlife observation and photography would remain in all three alternatives. Two of nine Refuge units are open to the public and both are in Clayton County, Iowa. Hunting, fishing, wildlife observation and photography account for approximately 55 visitor days annually to the Refuge. The majority of the use is hunting. These activities result in activity related equipment purchases and travel-related goods and services.

Most expenditures are from residents within the county, but there are some visitors from other counties and states. The total annual expenditures for current levels of hunting are estimated at $556 with a tax revenue of $46. Other activities would provide a lesser amount of expenditures. Visitor days may increase under all three alternatives because of a greater demand for public land and recreation. Alternative C would provide the most opportunity for increased public use and associated economic impacts.

4.7.3 Refuge Land Acquisition

In 2003, the Refuge Revenue Sharing payments to four counties for the Refuge totaled $2732. These are payments under the Refuge Revenue Sharing Act (16USC 715s) intended to offset losses in tax revenues based on an appraised value of the land. Payments are based on the greater of:

- 75 cents/acre;
- 0.74 percent of appraised value; or
- 25 percent of the net receipts collected from the Service unit.

These payments would continue under all alternatives according to the Act and congressional appropriations.

Some lands proposed to be acquired by the Refuge under Alternatives B and C are currently used for agricultural production or timber harvest. Many of the areas acquired for the Refuge are marginal land for agricultural production because they are highly erodible. Algific slopes themselves provide very little pasture or timber value. Agricultural uses would not continue under Refuge ownership, with the exception of a small amount of cooperative farming for Refuge management. The Service's cooperative farming program may be used for ground preparation prior to planting native vegetation and would be used on a temporary basis. These crops would provide a small amount of income for a cooperative farmer.

Alternative B proposes the most land acquisition of 3400 acres. Alternative C proposes 2275 acres. This acreage is scattered over a large area (Figure 1 on page 7). Land use would change on only a portion of this acreage. Most agricultural land is used for corn, soybeans, or beef and dairy cattle production. Acreage removed from crop production is estimated at 600 acres. Annual crop value is estimated at $19,000 each for corn and soybeans. Assuming most of the additional land would be forested land where endangered species habitat occurs, approximately 1,800 acres may be removed from private timber harvest. Assuming that about 120 acres are acquired each year for 15 years, and that this acreage would only be harvested once in a 15-year time period, the average annual timber production would decrease by about $57,000. The economic impact of corn, soybeans, and timber would total about $1.42 million over 15 years. Tax revenue associated with agricultural sales would also decrease by about $120,000 annually. Some of these values are based on land in Iowa. Some proposed acquisition may also occur in Illinois, Minnesota and Wisconsin where values could be different.

4.8 Cumulative Effects

Alternative A contains no additional land acquisition for endangered species habitat protection. This situation, combined with little ongoing habitat protection by other agencies, would have a cumulative effect of taking much longer to reach recovery goals for target species, if they were reached at all. Minimal invasive species control on the Refuge in Alternatives A and B, combined with little control of land use on adjacent lands, may cause an increase in invasive species in the local area. Habitat restoration on acquired lands in all alternatives, in addition to restoration occurring on adjacent lands, would be beneficial to wildlife, soil conservation, water quality, and aesthetics.

The preferred alternative (Alternative C) would have a potential to increase public use and the associated developments, such as parking areas and a trail on the Howard Creek unit. These developments could also be added to new units of the Refuge if they are opened to public uses. A potential for disturbance from increased public use combined with increased Refuge management activities may cause a cumulative increase in disturbance to endangered species habitat. However, we anticipate that the increase in public use will be small and actions of increased law enforcement and public education will negate this cumulative impact. In addition, any new public uses would only be allowed where sufficient buffer to endangered species habitat exists. Management actions such as invasive species control or study of algific slopes are also intended to be completed in ways that minimize disturbance. Thus, the cumulative impact of disturbance is minor.

Alternatives B and C would provide an increase in the number of acres of land protected by a conservation organization. The cumulative impact from increased acquisition is protection of other biological and physical resources in addition to the targeted endangered species. There may also be some additional land protection from other agencies during the same time period that would protect additional biological resources. The cumulative effect of alternative C is recovery of listed species.

Land will be taken out of agricultural production through Refuge acquisition that could cause small economic effects (see Section 4.7). Increased urban development and private recreational land acquisition in the next 15 years could also take land out of agricultural production for a cumulative local economic effect. The additional Refuge acquisitions will be small parcels scattered over a large area that would not contribute greatly to other land use changes.

4.9 Summary of Environmental Consequences by Alternative

The consequences of each alternative are summarized in Table 3.

Table 3: Environmental Consequences

	Alternative A: Present Course of Habitat Protection and Limited Public Use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation
Cultural Resources	Meet legal obligations and resources will be protected.	Same as Alt. A.	Same as Alt. A.
Listed Species	Recovery goals not met. Delisting will not occur.	Primary recovery goal of permanent protection is met with aggressive land acquisition. Delisting may not occur because minimal management to meet other recovery goals.	Multiple recovery goals met and delisting is likely to occur for the Iowa Pleistocene snail with an intermediate amount of land acquisition. Significant progress towards recovery for Northern monkshood and Leedy's roseroot.
Habitat	Lack of desirable habitat for other trust species. Potential for negative effects on algific talus slopes. 40 acres of grassland restored in 4 years. 48 acres of forest planted, other forests restored through natural succession	Lack of desirable habitat for other trust species. Potential for negative effects on algific talus slopes. 40 acres of grassland restored in 4 years. Forest restored through natural succession.	Beneficial effects for other trust species. Maintain or benefit on algific talus slopes. 40 acres of grassland restored in 4 years and 116 acres of forest planted in 8 years.
Wildlife-Dependent Recreation	No change in public support for refuge mission. No increase in public opportunities. Slight increase in public use.	Same as Alt. A.	Increased public support for Refuge mission Increased public opportunities, primarily by environmental education. Moderate increase in public use and slight increase in potential for disturbance.

Table 3: Environmental Consequences

	Alternative A: Present Course of Habitat Protection and Limited Public Use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation
Other rare species	No additional protection, threats may increase.	Protection of 5 sites and 200 acres will begin proactive protection of these species. No inventory and no new information on these species.	Protection of 3 sites and 75 acres will begin proactive protection of these species. Inventory of species will aid in understanding of sites and threats. Activity on algific slopes for inventory causes increased risk for disturbance mitigated by identified actions.
Economic Impact	The economic impact of current Refuge activities is minor. Refuge expenditures remain similar to 2004. Wildlife-dependent recreation related expenses are minor and remains the same. No new land acquisition.	Refuge expenditures would be similar to 2004. Wildlife-dependent recreation related expenses remains the same. Refuge land acquisition will take some land out of agricultural production but minor amount overall.	Refuge expenditures would increase slightly over 2004. Wildlife dependent recreation related expenses may increase slightly. Refuge land acquisition will take some land out of agricultural production but minor amount overall.
Administrative Support	No change.	No change.	Increased.
Prescribed Fire	Improved wildlife habitat. Benefit of increased recreational opportunity from quality wildlife habitat. Smoke could be a temporary hazard. No impacts to listed species.	Same as Alt. A	Same as Alt. A.

Table 3: Environmental Consequences

	Alternative A: Present Course of Habitat Protection and Limited Public Use (No Action)	Alternative B: Habitat Protection Emphasis	Alternative C: Habitat Protection, Increased Management, and Integrated Wildlife-Dependent Recreation
Cumulative effects	Recovery goals would take much longer to occur, if at all. Likely increase in invasive species.	Only a portion of recovery goals met Likely increase in invasive species.	Multiple recovery goals met. Delisting of Iowa Pleistocene snail. Reduction in invasive species.
	Undesirable wildlife habitat with little restoration.	Same as Alt. A.	Increase in desirable wildlife habitat
	Least overall protection of habitat, water quality, soils, aesthetics.	Most overall protection of habitat, water quality, soils, aesthetics through acquisition.	Medium overall protection of habitat, water quality, soils, aesthetics through acquisition. Additional protection of these features through other means than acquisition.
		Most land acquisition. Increased urban development and private recreational land combined with Refuge acquisition will increase land taken out of agriculture. Refuge lands are small tracts over large area.	Medium land acquisition. Increased urban development and private recreational land combined with Refuge acquisition will increase land taken out of agriculture. Refuge lands are small tracts over large area.

Chapter 5: List of Preparers

Cathy Henry, Refuge Operations Specialist
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Ms. Henry served as the primary author and coordinated with agencies and the public. She has worked for the U.S. Fish and Wildlife Service for 12 years. She has a Bachelor of Science degree in Animal Ecology and a Master of Science degree in Wildlife and Fisheries Science.

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Mr. DeAllesio prepared several maps for the comprehensive conservation plan.

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Ms. Hodgins served as primary editor.

Chapter 6: Consultation and Coordination with the Public and Others

List of Agencies, Organizations, and Persons to whom copies of the EIS have been sent

An ESA Intra-Service Section 7 Consultation has been completed.

The respective Departments of Natural Resources in Iowa, Wisconsin, Illinois, and Minnesota have been involved in the CCP with the formulation of an interagency planning team that has met several times and was briefed on the preferred alternative in February 2004. The states support Refuge expansion.

Chapter 7: Public Comments on Draft EIS

This chapter is reserved for the Final EIS.

Chapter 8: References

Bailey, R.G. 1995. Description of the Ecoregions of the United States. USDA Forest Service

Cahayla-Wynne, R. and D.C. Glenn-Lewin. 1978. The Forest Vegetation of the Driftless Area, Northeast Iowa. Am. Midl. Natural. 100(2):307-319.

Commonwealth Cultural Resources Group, Inc. 2002. Comprehensive conservation plan archaeological and historic resources, Driftless Area National Wildlife Refuge in Allamakee, Clayton, Delaware, Dubuque, Fayette, and Jackson Counties, Iowa and Grant County, Wisconsin. WR-0110. Prepared for U.S. Fish and Wildlife Service, Fort Snelling, MN

Frest, T.J. 1982. Project SE-1-4 Iowa Pleistocene snail final report. University of Iowa, Iowa City, IA 162pp.

Frest, T.J. 1983. Final report northern driftless area survey. University of Iowa, Iowa City, IA. 17pp.

Frest, T.J. 1985. Final report Iowa Pleistocene snail survey. University of Washington, Seattle, WA. 37pp.

Frest, T.J. 1986. Final report Iowa Pleistocene snail survey. University of Washington, Seattle, WA. 26pp.

Frest, T.J. 1987. Final report Iowa Pleistocene snail project. University of Washington, Seattle, WA. 39pp.

Frest, T. J. 1991. Summary status reports on eight species of candidate land snails from the driftless area (paleozoic plateau), upper midwest. Seattle, WA

Glenn-Lewin, D.C., R.H. Laushman, and P.D. Whitson. 1984. The Vegetation of the Paleozoic Plateau, Northeastern Iowa. Proc. Iowa Acad. Sci. 91(1):22-27.

Hemesath, L.M. and W.R. Norris. 1998. Forest avifauna of northeast Iowa. Iowa Bird Life 68(2):29-41.

Henry, C., W.R. Clark, M.J. Burns, C. Dettman. 2003. Population monitoring protocol for the Iowa Pleistocene snail (*Discus macclintocki*). U.S. Fish and Wildlife Service, McGregor, IA 31 pp+app.

Kemperman, J. 1983. Forests and Forestry pages 33-35 in Iowa Conservationist. Iowa Conservation Commission, Des Moines, IA

Knutson, M.G., G. Butcher, J. Fitzgerald, and J. Shieldcastle. 2001. Partners in Flight Bird Conservation Plan for the Upper Great Lakes Plain (Physiographic Area 16). USGS Upper Midwest Environmental Sciences Center in cooperation with Partners in Flight. LaCrosse, WI.

Ross, T.K. 1999. Phylogeography and conservation genetics of the Iowa Pleistocene snail. Molec. Ecol. 8:1363-1373.

U.S. Fish and Wildlife Service. 1990. Driftless Area National Wildlife Refuge Management Prospectus. U.S. FWS, McGregor, IA 25pp.

U.S. Fish and Wildlife Service. 1983. National recovery plan for northern monkshood (*Aconitum noveboracense*). U.S. Fish and Wildlife Service, Twin Cities, MN. 81pp.

U.S. Fish and Wildlife Service. 1984. National recovery plan for Iowa Pleistocene snail (*Discus macclintocki* (Baker)). U.S. Fish and Wildlife Service, Twin Cities, MN. 23pp + app.

U.S. Fish and Wildlife Service. 1986. National driftless area land protection plan. U.S. Fish and Wildlife Service, Twin Cities, MN. 20pp.

U.S. Fish and Wildlife Service. 1998. Sedum integrifolium spp. Leedyi (Leedy's roseroot) Recovery Plan. Ft. Snelling, MN. 31pp.

U.S. Fish and Wildlife Service. 2002. Region 3 Fish and Wildlife Resource Conservation Priorities. Ft. Snelling, MN

U.S. Fish and Wildlife Service. 2002. Driftless Area National Wildlife Refuge Fire Management Plan. McGregor, IA 29 pp.

U.S. Fish and Wildlife Service. 2004. The economic impacts of the Driftless National Wildlife Refuge. 15pp.

Appendix A: Comprehensive Conservation Plan Chapters

Comprehensive Conservation Plan Chapters

Note: These chapters include Chapter 4, Management Direction, and Chapter 5, Plan Implementation for the preferred alternative. These chapters will change if a different alternative is selected. They will be added to the CCP once a decision is made on the alternatives.

Chapter 4: Refuge Management

4.1 Our Vision for the Refuge

The vision for the Upper Mississippi River National Wildlife Refuge Complex is:

> The Complex is beautiful, healthy, and supports abundant and diverse native fish, wildlife, and plants for the enjoyment and thoughtful use of current and future generations. This can be stepped down to apply to Driftless Area NWR as follows: The Refuge is beautiful, healthy, and supports and conserves native and rare wildlife and plants for current and future generations.

This section presents a 15-year plan for the Refuge in the form of Refuge goals, objectives, and strategies. This section is organized into three broad areas:

- Habitat
- Species Management
- Visitor Services

The goals that follow are specific statements of what will be accomplished. Objectives describe the who, what, when, where, and why of what is to be accomplished. Strategies listed under each objective specify the activities that will be pursued to realize an objective. The strategies may be refined or amended as specific tasks are completed or new research and information come to light.

4.2 Habitat

4.2.1 Habitat Goal

Goal: Conserve endangered species habitat and contribute migratory bird and other wildlife habitats within a larger landscape.

Objective 1: Increase management of physical and ecological impacts to algific slopes by eliminating invasive species (on slopes), maintaining zero impacts from public use, and reducing off Refuge impacts on two units by 2015.

Rationale: The Refuge purpose is to conserve endangered and threatened species. This objective is tied to the purpose of the Refuge and Iowa Pleistocene snail and Northern monkshood recovery plan goals for permanent protection of habitat. Algific talus slopes are fragile because of the steep slopes with a loose surface rock layer. All algific slopes would remain closed to all public entry. However, some management activity on algific slopes is needed to maintain their ecological integrity. Invasive garlic mustard is competing with Northern monkshood. It has unknown effects on the Iowa Pleistocene snail, but we speculate garlic mustard could affect its specific food requirements. Removal of garlic mustard can be completed by carefully hand pulling it on some sites, but may take several years to control using this method because of the seed bank present. Vegetation adjacent to algific talus slopes can affect temperatures and other microclimate characteristics important to the species that inhabit them. Study of the impact of shade on algific talus slopes would help in determining what the best restoration options are adjacent to the slopes. Population monitoring of both species would continue at 2004 levels on selected sites on and off Refuge. These management activities would be done under specific guidelines such as restricting the number of people, number of sites, avoiding more sensitive sites, using wildlife trails, and other restrictions to prevent damage to the habitat.

Strategies:

1. Maintain existing closed areas.
2. Ensure boundary signing and fencing on all units are adequate
3. Increase inspection of units, on average 8 hours per week, particularly during hunting seasons.
4. Share a law enforcement officer with the McGregor District of UMRNWFR.
5. Increase contact with landowners adjacent to the Refuge to prevent impacts from grazing, logging, invasive species, erosion, and sinkhole filling. Specifically, use USDA programs, Partners for Fish and Wildlife program or endangered species funding to reduce erosion impacts to the Fern Ridge and Cow Branch units.
6. Remove all garlic mustard from algific slopes on the Howard Creek and Lytle Creek units in ways that minimize disturbance. Expand garlic mustard control efforts in surrounding habitats on all units.
7. Monitor Iowa Pleistocene snail and Northern monkshood populations (on Refuge and other public and private lands) at 2004 level of effort to measure population trends for recovery and as an indicator of habitat condition.
8. Monitor soil/vent temperatures on algific talus slopes with data loggers that collect daily temperatures.
9. Fund research to determine impacts of shade on algific talus slopes, particularly in regard to Northern monkshood. Complete study by 2010. This would aid in determining the best restoration alternative adjacent to algific slopes.
10. Add a wildlife biologist to the staff.

Objective 2: Restore existing 40 acres of grassland on the Howard Creek Unit to a mixture of at least 25 species of local genotype grasses and forbs by 2009.

Rationale: Other wildlife habitats are present on the Refuge and should be managed for Service trust resources when possible. Native climax vegetation would likely do best on the land and require the least long term maintenance once

established. The Howard Creek unit contains remnant native prairies and much of the area was once prairie or savanna. Some planting of native prairie species has already taken place on this unit and this objective is aimed at completing grassland restoration for the Howard Creek unit.

Strategies:

1. Use fire and other techniques to control invading woody vegetation on remnant and restored prairies.
2. Use biological, chemical, and mechanical controls to control invasive species on other habitats.
3. Develop partnerships with local groups to restore prairie and possibly create demonstration areas.
4. Plant a mixture of native grasses and forbs (local genotype).

Objective 3: Establish oak-hickory forests on all lands that were historically hardwood forest under pre-European settlement conditions by 2012.

Rationale: The majority of Driftless Area Refuge habitat is or was hardwood forest that has been impacted by past agricultural or logging uses. Some forests are degraded and some were completely cleared for farming. Changes to forests immediately adjacent to algific talus slopes may affect microclimate variables (i.e. shade helps maintain cool conditions) on slopes and increase encroachment of invasive species.

Although Refuge units are relatively small, they do provide habitat for Region 3 Resource Conservation Priority species and migratory non-game birds of management concern. Fragmentation of habitats both within and around Refuge lands is a concern for migratory bird management because of the effects of predators and parasitic cowbirds. Restoration of native vegetation on the Refuge would reduce, but not eliminate, fragmentation within units and would provide closer connection to forest in the surrounding landscapes. Active restoration by planting trees would speed restoration and provide the species desired for wildlife habitat.

Strategies:

1. Plant 116 acres of native forest on the Pine Creek (68 ac), Fern Ridge (41 ac), and Howard Creek (7 ac) units.
2. Develop partnerships with local groups to restore forests and evaluate feasibility of establishing reforestation demonstration areas.
3. Inventory exotic invasive species and develop plans for control on each unit.
4. Write habitat management plans for each Refuge unit and implement forest management plans for existing forests on the Fern Ridge and Bankston units during the life of the plan.

Objective 4: Permanently conserve 2200 additional acres of endangered species habitat above the 2004 level to achieve this recovery goal for the Iowa Pleistocene snail and contribute to recovery goals for the Northern monkshood and Leedy's roseroot by 2020.

Rationale: Permanent protection of habitat is the primary recovery goal for these species as the habitat cannot be restored once lost and the species are difficult to reintroduce. As well as achieving recovery goals, protection of additional algific talus slopes would meet the Service's goals of conserving biological integrity and diversity, and unique ecosystems and communities. Refuge land protection can lead to delisting of these species and may prevent future listing of other land snail and plant species.

The acreage listed in the objectives for this alternative is the acreage we believe is possible to protect in the next 15 years during the life of this plan given willing sellers and funding, and Refuge resources. The total approved acquisition area for the Refuge is proposed to be 6000 acres in 22 counties (four states) under a revised Land Protection Plan (Appendix I). Proposed acquisition for all sites includes algific talus slopes, associated sinkholes, and buffer areas around the slopes to protect from adjacent land uses. Protection may also be in cooperation with other agencies to meet the above goals. Acquisition would not necessarily occur in every county but where willing sellers exist for known species locations in any of these counties.

Strategies:

1. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
2. Acquire additional land adjacent to Refuge sites where the algific slopes or sinkholes are not under permanent protection.
3. Protect an additional 20 snail and monkshood sites
4. Acquire any Leedy's roseroot site that becomes available
5. Seek consistent annual Land and Water Conservation Fund appropriations to meet the objective.
6. Work with partners to protect sites through a variety of means such as funding provisions of the Endangered Species Act (Section 6), land trust conservation easements, U.S. Department of Agriculture programs, fund raising, and congressional appropriations.
7. Prioritize sites for protection and prepare site preservation plans in Geographic Information Systems format with state and partner input.
8. Protect sites through conservation easements and fee title acquisition.

Objective 5: Permanently conserve 75 additional acres of habitat above the 2004 level to help preclude listing of glacial relict species of concern by 2020.

Rationale: Some algific slopes are occupied by Service species of concern, but not by threatened and endangered species. This objective would begin to protect sites for these species to help preclude future listing as threatened or endangered.

Strategies:

1. Protect 3 sites for other species of concern.
2. Maintain contact with landowners to maintain integrity of sites and identify willing sellers. Use assistance from partners such as TNC.
3. Protect sites through conservation easements and fee title acquisition.

4.2.2 Species Management

Goal: Manage and protect endangered species, other trust species, and species of management interest based on sound science through identification and understanding of algific slope communities and associated habitats.

Objective 1: Identify and evaluate new algific slopes in the Driftless Area for the presence of threatened and endangered species and species of concern within 3 years of plan approval.

Rationale: Initial surveys to locate algific talus slopes and associated species were done in the 1980s. Several new algific slopes were found in the last few years just by casual observation, indicating that more may be present than is currently known. A renewed comprehensive survey should be done to ensure that as many algific slopes as possible are known. This information may shed new light on species abundance or threats to endangered and rare species. Survey of potential habitat is a recovery goal.

Strategies:

1. Review existing algific slope records to identify potential new survey locations. Actively search areas that may have been underrepresented in original surveys. Survey any new locations for Iowa Pleistocene snail and Northern monkshood.
2. Seek assistance from partners such as TNC to provide funding or people to accomplish objective.

Objective 2: Establish the size of upland buffers needed to provide permanent protection of algific talus slopes by 2009.

Rationale: Sinkholes are crucial to cold air flow on algific talus slopes. Their function, locations, and distance from slopes is not completely known. More information is needed on sinkhole locations and distance from algific talus slopes. This objective is also a recovery task for the Iowa Pleistocene snail and is essential to determining land protection areas and strategies.

1. Conduct winter surveys to locate sinkholes associated with algific slopes to aid in protection efforts.
2. Initiate studies to determine the function and association of sinkholes to cold air flow and hydrology.

Objective 3: Gain a better understanding of plants and animals associated with algific talus slopes and similar habitats in the Driftless Area.

Rationale: Comprehensive surveys for plants and insects have never been done for algific talus slopes. There may be additional rare, endemic or new species. Inventory of wildlife on other Refuge habitats has not been completed. An inventory of Refuge plant and animal communities is needed to prepare effective management strategies. The Refuge Improvement Act also requires inventory and monitoring of fish, wildlife, and plants on all Refuges. Refuge partners are also interested in inventory of algific slopes.

Strategies:

1. Use experts to inventory snail, plant and insect species on six or more algific talus slopes within 8 years of plan approval.
2. Inventory birds on Refuge units to document habitat use.

Objective 4: By 2008, determine the appropriate deer density for Refuge units that will safeguard habitat.

Rationale: Deer populations in northeast Iowa have been high for several years. There is concern that high deer densities, particularly on units where hunting is not allowed, could impact algific talus slopes as well as other habitats. The population level that causes negative impacts needs to be determined.

Strategies:

1. Use research or literature searches to determine the current and desired deer density on the Refuge.
2. Working with states, manage deer populations at a level and population structure that does not negatively impact algific slopes or associated habitats.

Objective 5: Update the recovery plans for Iowa Pleistocene snail and Northern Monkshood within 5 years of CCP approval.

Rationale: The current recovery plans for these species are outdated and do not include all locations, specific recovery objectives, threats, or specific monitoring guidelines. Updated plans would provide for better planning and species protection and increase the likelihood of recovery.

Strategies:

1. Work with Ecological Services and applicable states to update and rewrite draft recovery plans.

4.2.3 Visitor Services Goal

Goal: Visitors have an understanding and appreciation of the role of the Refuge in conserving endangered species.

Objective 1: Increase environmental education programs by 50 percent within 8 years of CCP approval and establish a reliable system for documenting and monitoring public use within 5 years of CCP approval.

Rationale: Promotion of the Refuge and wildlife-dependent recreation has historically been limited because of the sensitive nature of endangered species habitat and limited staff to manage public use. However, the public is now more aware of land owned by the Service and has expressed interest in increasing outreach and wildlife-dependent recreation opportunities. With targeted programs, visitors' understanding of the Refuge's purpose can be enhanced. Education about endangered species and the special resources of the Driftless Area may promote stewardship among landowners and therefore further protection of rare and endangered species. Education about snails and their habitat is a recovery task.

Only units with public access routes and sufficient acreage surrounding endangered species habitat would be open to the public. However, there is a level of use that could cause unacceptable changes in habitat and wildlife. To better achieve the endangered species purpose of the Refuge, the level below which impacts are negligible needs to be determined. The primary increased use would be off-site environmental education.

Strategies:

1. Howard Creek and Fern Ridge units would remain open to upland game and white-tailed deer hunting.
2. Steeles Branch and Fern Ridge units would remain open to fishing.
3. Howard Creek and Fern Ridge units would remain open to wildlife observation and photography.
4. Maintain McGregor District Visitor Contact Station as place of primary public contact.
5. Develop information kiosk at the Fern Ridge unit by 2007.
6. Develop a wildlife observation trail at the Howard Creek Unit by 2008
7. Develop an interpretive display at McGregor District Visitor Contact Station by 2007.
8. Present to local school groups at least 10 environmental education programs per year, with an emphasis on endangered species.
9. Share an interpretive park ranger with the McGregor District.
10. Develop a Visitor Services Plan within 2 years of CCP approval. The Plan will describe basic visitor and resource protection, appropriate signing, informational brochures, Visitor Center displays, and other information needed for visitors to have an educational and enjoyable experience.
11. Permit compatible wildlife-dependent recreation on newly acquired lands.
12. Establish reliable system for documenting and monitoring public use within 2 years of plan approval.
13. Establish the relationship between the level of use and impacts to resources within 5 years of plan approval.

Chapter 5: Plan Implementation

5.1 Personnel and Office Needs

One Refuge Operations Specialist is currently assigned to the Refuge and supervised by the McGregor District Manager. A wildlife biologist will be added to implement the many goals and objectives identified in this CCP. The Nature Conservancy of Iowa has funded a summer intern to work at the Refuge for the last three years and plans to continue this position as funds permit, to assist with endangered species monitoring and other tasks of interest to both the Service and TNC. McGregor District staff occasionally assists with maintenance, prescribed burning and habitat improvements on the Refuge.

Refuge staff currently use a mobile home (obtained as excess property from the Federal Emergency Management Agency) located adjacent to the McGregor District office. It is not clear to visitors that the Driftless Area Refuge office is here and there is only a small display made by Refuge staff in the McGregor District Visitor Contact Station. The Refuge shares limited equipment storage space with McGregor District. A new office located with McGregor District or at a different location is needed to meet basic operational needs.

5.2 Step-down Management Plans

This CCP provides broad guidance for future management and land acquisition for Driftless Area National Wildlife Refuge. Before projects are implemented, additional detailed plans will need to be prepared. Several step-down management plans must be completed to better describe the planned work and to meet Service policy. The following plans will be completed during the life of the CCP:

- Habitat Management Plan
- Unit Management Plans
- Forest Management Plans
- Endangered Species Site Preservation Plans
- Visitor Services Plan
- Funding

Funding will come from a variety of internal and external sources. Refuge maintenance funds are currently used primarily for fencing needs and replacement of tools and equipment. Habitat restoration funds have come from challenge cost share grants or internal funds. All of these funding sources are in short supply. The full implementation of this plan will be dependent on increased traditional funding or new sources of funding as a result of partnerships or grants. In particular, partnerships for land acquisition and habitat restoration may be needed. The Nature Conservancy, Iowa Natural Heritage Foundation, States, and universities are potential partners that have expressed interest in various actions identified in the plan. Volunteers will also be important in assisting Refuge staff with fulfilling the future vision of the Refuge.

5.3 Partnerships

Partnerships are an essential element in accomplishing our goals and objectives.

We will continue our partnerships with The Nature Conservancy, the Iowa Natural Heritage Foundation, and the Iowa DNR. We will continue to seek creative partnerships to achieve our vision.

5.4 Volunteer Program

We will work with volunteers in carrying out the activities of this plan. Likely activities where volunteers can help us are habitat restoration, monitoring, and invasive species removal.

5.5 Monitoring and Evaluation

Monitoring is critical to the successful implementation of the plan. Every five years this plan will be revisited to document progress, reassess direction and determine if any modifications are necessary to meet changing conditions. Public involvement in evaluating progress and plan implementation will be encouraged. Increased public visitation and new facilities will be evaluated for compatibility with Refuge purposes.

Appendix B: Glossary

Appendix B: Glossary

Algific Talus Slope: Cold producing rocky slope in which air circulation and groundwater infiltration produce more or less permanent underground ice whose incomplete melting produces a constant stream of moist cool air which filters through a thin plant and litter cover over an extensive rock talus.

Aquatic Species: Includes all freshwater, anadromous and estuarine fishes, freshwater mollusks, freshwater crustaceans and freshwater amphibians.

Archaeological and Cultural Values: Any material remains of past human life or activity greater than 100 years old which are of archaeological interest as defined by Section 4(a) of the Archaeological Resources Protection Act and 43 CFR Part 7.3.

Biodiversity: The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

Biologic Integrity Biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities.

Candidate Species: Those species for which the Service has on file sufficient information on biological vulnerability and threats to propose them for listing.

Compatible Use: A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director or designee, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge (PL 105-57).

Comprehensive Conservation Plan: A document, completed with public involvement, that describes the desired future condition and provides long-term (15 year planning horizon) guidance to accomplish the purposes of the refuge system and the individual refuge units.

Conservation: The management of natural resources to prevent loss or waste. Management actions may include preservation, restoration and enhancement.

Conservation Agreements: Written agreements reached among two or more parties for the purpose of ensuring the survival and welfare of unlisted species of fish and wildlife and/or their habitats, or to achieve other specified

conservation goals. Participants voluntarily commit to implementing specific actions that will remove or reduce the threats to these species.

Conservation (Species): The use of all methods and procedures which are necessary to bring any species to the point at which the measures provided are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation. Conservation is the act of managing a resource to ensure its survival and availability.

Cross-program: Communication and cooperation between multiple programs. The Service is organized into programs such as Refuges, Migratory Birds, Law Enforcement, Fisheries, International Affairs, Endangered Species, and Environmental Contaminants.

Cultural Resources: Cultural Resources: "those parts of the physical environment - natural and built - that have cultural value to some kind of sociocultural group... [and] those non-material human social institutions...." (King, p.9). Cultural resources include historic sites, archeological sites and associated artifacts, sacred sites, traditional cultural properties, cultural items (human remains, funerary objects, sacred objects, and objects of cultural patrimony) (McManamon, Francis P. DCA-NPS; letter 12-23-97 to Walla Walla District, COE), and buildings and structures.

Delisting: A process for removing a listed species from the lists of threatened and endangered species due to recovery. Delisting requires a formal rulemaking procedure, including publication in The Federal Register.

Direct Take: Under the authorities of the Migratory Bird Treaty Act, direct take is to pursue, hunt, shoot, wound, kill, trap, capture, or collect; or attempt to pursue, hunt, shot, wound, kill, trap, capture, or collect.

Downlisting: Process for changing a species' status from endangered to threatened due to a reduction in threats and improved status of the species. Downlisting requires a formal rulemaking procedure, including publication in The Federal Register.

Ecosystem: Dynamic and interrelating complex of plant and animal (including humans) communities and their associated non-living environment.

Ecosystem Approach: 1) Protecting or restoring the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated. 2) Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and

that basic ecosystem processes are perpetuated indefinitely (Clark and Zaunbrecher 1987).

Ecosystem Management Plans: Plans developed that identify natural resource needs, set resource goals and objectives, identify needed actions, determine budget needs and outline a process to monitor and evaluate the success of the actions.

Endangered Species: A listed species in danger of extinction throughout all or a significant portion of its range.

Endangered Species Consultations: Process whereby federal agencies consult with the Service on any prospective agency action when the agency has reason to believe that an endangered or threatened species may be effected by an action the agency is funding, permitting, or conducting.

Endangered Species Listing: The process of adding a species to the Endangered Species list, which includes publication in The Federal Register of a proposed rule to list the species, a public comment period allowing for one or more public hearings, and a final determination either to list the species or withdraw the proposal.

Enhance (habitats): Improves habitat through alteration, treatment, or other land management of existing habitat to increase habitat value for one or more species without bringing the habitat to a fully restored or naturally occurring condition.

Environmental Health: Composition, structure, and functioning of soil, water, air and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.

Forest Fragmentation: Fragmentation may occur when a forested landscape is subdivided into patches. Fragmentation may also occur when numerous openings for such things as fields, roads, and powerlines interrupt a continuous forest canopy. The resulting landscape pattern alters habitat connectivity and edge characteristics, influencing a variety of species.

Geographic Information System: GIS aids in the collection, analysis, output and distribution of spatial data and information.

Glacial Relict Species: A plant or animal known from fossil records to have existed during glacial events, or the Ice Age, that still exists today.

Invasive Species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Karst: A type of topography that is formed on limestone, gypsum, and other soluble rocks, primarily by dissolution. Karst landscapes are

characterized by sinkholes, caves, and underground drainage. (American Geological Institute)

Maderate Cliff: An algific talus slope that has lost the talus layer from erosion to form a cliff face. The small cracks that feed cold air are then exposed on the surface of the cliff creating a cold moist habitat.

Migratory Nongame Birds of Management Concern: Those species of nongame birds that (a) are believed to have undergone significant population declines; (b) have small or restricted populations; or (c) are dependent upon restricted or vulnerable habitats.

Migratory Species: Species that move substantial distances to satisfy one or more biological needs, most often to reproduce or escape intolerable cyclic environmental conditions.

Multi-species Recovery Plan: A recovery plan developed for more than one listed species. Multi-species recovery plans are usually developed for groups of listed species that share similar habitat and/or face similar threats.

National Wildlife Refuge System: All lands and waters and interests therein administered by the Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish and wildlife, including those that are threatened with extinction.

National Outreach Strategy: Outreach is a two-way communication between the Service and the public to access understanding and impact of the Service's education programs. It establishes mutual understanding and promotes involvement with the goal of improving joint stewardship of America's fish and wildlife resources.

Partnership Agreements: See Conservation Agreements.

Population Monitoring: Assessments of the characteristics of populations to ascertain their status and establish trends related to their abundance, condition, distribution or other characteristics.

Prescribed Fire: Controlled fires set under specific conditions (prescription) to meet specific habitat objectives.

Protect (habitat): Maintain current quality or prevent degradation to habitat. The act of ensuring that habitat quantity and quality do not change, most often as a result of human activities but sometimes in response to unwelcome natural processes or phenomena.

Recovery Plans (species): Documents developed by the Service that outline tasks necessary to stabilize and recover listed species. Recovery plans include goals for measuring species progress towards recovery, estimated costs and time frames for the recovery process, and an identification of

public and private partners that can contribute to implementation of the recovery plan.

Reintroduction (of species): Listed species reintroduced into their former range when such an action is necessary for species recovery and is called for in an approved recovery plan. Species may be reintroduced with the full protection of their listed status or as an experimental population that allows for greater flexibility in how the reintroduced individuals are managed.

Restore (habitat): Returns the quantity and quality of habitat to some previous naturally occurring condition, most often some baseline considered suitable and sufficient to support self-sustaining populations of fish and wildlife.

Riparian Habitats: Those lands adjacent to streams or rivers that form a transition zone between aquatic and upland systems and are typically dominated by woody vegetation that is of a noticeably different growth form than adjacent vegetation. Riparian areas may or may not meet the definition of wetlands used by Cowardin et al (1979).

Sinkhole: A funnel-shaped depression in a karst area, commonly with a circular or oval pattern. Sinkhole drainage is subterranean and sinkhole size is usually measured in meters or tens of meters. Common sinkhole types include those formed by dissolution, where the land is dissolved downward into the funnel shape, and by collapse where the land falls into an underlying cave (American Geological Institute)

Species of Concern: A species not on the federal list of threatened or endangered species, but a species for which the Service or one of its partners has concerns.

Stakeholders: State, tribal, and local government agencies, academic institutions, the scientific community, non-governmental entities including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

Threatened Species: A listed species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval..." (36 CFR 800.16(y); 12-12-2000), i.e., all Federal actions.

Uplands: All lands not meeting the definition of wetlands, deepwater, or riverine.

Visitors: The total number of visitors to the Refuge System and Fish Hatchery System as estimated by refuge managers in the annual

	Public Education and Recreation module of the Refuge Management Information System and by hatchery managers in.
Watershed:	The area drained by a river or stream and its tributaries.
Wetlands:	Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (Cowardin et. al., 1979. In layman's terms, this habitat category includes marshes, swamps and bogs.
Wildlife-dependent recreational use:	A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

Appendix C: Species List

Species List

Common and scientific names of plants and animals referenced in the text or found on the Refuge. State or federal threatened and endangered status is given. A complete species list for the Refuge has not been completed. Not all of the bird species in this list have been confirmed on Refuge lands, but do occur in the area. Some algific talus slope species do not have common names.

Bird List for Driftless NWR

Common name	Scientific name	Status*	Resource Conservation Priority (RCP) Species
Acadian Flycatcher	*Empidonax virescens*	W T	✓
American Robin	*Turdus migratorius*		
American Woodcock	*Scolopax minor*		✓
Bald Eagle	*Haliaeetus leucocephalus*	F T, I E, IL T	✓
Black-and-White Warbler	*Mniotilta vana*		
Black-billed Cuckoo	*Coccyzus erythropthalmus*		✓
Blue-winged Teal	*Anas discors*		✓
Blue-winged Warbler	*Vermivora pinus*		✓
Bobolink	*Dolichonyx oryzivorus*		✓
Brown Thrasher	*Toxostoma rufum*		
Brown-headed Cowbird	*Molothrus ater*		✓
Cerulean Warbler	*Dendroica cerulea*	W T	
Chestnut-sided Warbler	*Dendroica pensylvanica*		
Common Grackle	*Quiscalus quiscula*		
Common Yellowthroat	*Geothlypis trichas*		
Dickcissel	*Spiza americana*		✓
Eastern Bluebird	*Sialia sialis*		
Eastern Meadowlark	*Sturnella magna*		✓
Field Sparrow	*Spizella pusilla*		✓
Golden-winged Warbler	*Vermivora chrysoptera*		✓

Bird List for Driftless NWR (Continued)

Common name	Scientific name	Status*	Resource Conservation Priority (RCP) Species
Grasshopper Sparrow	*Ammodramus savannarum*		✓
Henslow's Sparrow	*Ammodramms henslowii*		✓
Kentucky Warbler	*Oporornis formosus*	W T	✓
Long-eared Owl	*Asio otus*		✓
Loggerhead Shrike	*Lanius ludoviscianus*	M T, IL T	✓
Louisiana Waterthrush	*Seiurus motacilla*		✓
Mallard	*Anas platyrhynchos*		✓
Mourning Dove	*Zenaida macroura*		
Northern Flicker	*Colaptes auratus*		✓
Northern Harrier	*Circus cyaneus*	I E, IL E	✓
Northern Shrike	*Lanius excubitor*		
Orchard Oriole	*Icterus spurius*		✓
Pileated Woodpecker	*Dryocopus pileatus*		
Prothonotary Warbler	*Protonotaria citrea*		
Red-bellied Woodpecker	*Melanerpes carolinus*		
Red-eyed Vireo	*Vireo olivaceus*		
Red-headed Woodpecker	*Melanerpes erythrocephalus*		✓
Red-shouldered Hawk	*Buteo lineatus*		✓
Red-tailed Hawk	*Buteo jamaicensis*		
Ring-necked Pheasant	*Phasianus colchicus*		
Ruffed Grouse	*Bonasa umbellus*		
Sedge Wren	*Cistothorus platensis*		✓
Short-eared Owl	*Asio flammeus*		✓
Song Sparrow	*Melospiza melodia*		
Upland Sandpiper	*Bartramia longicauda*		✓
Veery	*Catharus fuscescens*		
Western Meadowlark	*Sturnella neglecta*		✓

Bird List for Driftless NWR (Continued)

Common name	Scientific name	Status*	Resource Conservation Priority (RCP) Species
Whip-poor-will	*Caprimulgus vociferus*		✓
Wood Duck	*Aix sponsa*		✓
Wood Thrush	*Hylocichla mustelina*		✓
Yellow-billed Cuckoo	*Coccyzus americanus*		
Yellow-throated Vireo	*Vireo flavifrons*		

* Threatened and endangered status: F=Federal, I=Iowa, IL=Illinois, M=Minnesota, O=Ohio, NY=New York, W=Wisconsin. T=threatened, E=endangered

Plant List for Driftless NWR

Common name	Scientific name	Status*
	Carex peckii	
Adoxa	*Adoxa moschatellina*	W T, IL E
Alder buckthorn	*Rhamnus alnifolia*	IL E
Balsam fir	*Abies balsamea*	
Basswood	*Tilia americana*	
Big bluestem	*Andropogon gerardi*	
Bitternut hickory	*Carya cordiformis*	
Black cherry	*Prunus serotina*	
Black walnut	*Juglans nigra*	
Black-eyed susan	*Rudbeckia hirta*	
Box elder	*Acer negundo*	
Canada anemone	*Anemone canadensis*	
Canada thistle	*Cirsium arvense*	
Canada yew	*Taxus canadensis*	
Compass plant	*Silphium laciniatum*	
Fragile fern	*Cystopteris fragilis*	
Daisy fleabane	*Erigeron strigosus*	
Dwarf enchanter's nightshade	*Circaea alpina*	IL E
Dwarf scouring rush	*Equisetum scirpoides*	IL E
Dwarf goldenrod	*Solidago sciaphila*	
Dwarf raspberry	*Rubus pubescens*	
Equisetum pratense	*Equisetum pratense*	IL T
European buckthorn	*Rhamnus cathartica*	
False gromwell	*Onosmodium occidental*	
False medic grass	*Schizachne purpurescens*	
Flowering spurge	*Euphorbia corollata*	
Forbes' saxifrage	*Saxifraga forbesii*	
Frigid ambersnail	*Catinella gelida*	
Garlic mustard	*Alliaria petiolata*	
Golden saxifrage	*Chrysosplenium iowense*	I T, M E
Hackberry	*Celtis occidentalis*	

Plant List for Driftless NWR (Continued)

Common name	Scientific name	Status*
Hairy puccoon	*Lithospermum croceum*	
Harebell	*Campanula rotundifolia*	
Hoary vervain	*Verbena stricata*	
Indian grass	*Sorghastrum nutans*	
Ironwood	*Ostrya virginiana*	
Kidney leaved violet	*Viola renifolia*	
Leadplant	*Amorpha canescens*	
Leaf-cup	*Polymnia canadensis*	
Leafy spurge	*Euphorbia esula*	
Leatherwood	*Dirca palustris*	
Leedy's roseroot	*Sedum integrifolium*	F T, M E
Little bluestem	*Schizachyrium scoparium*	
Limestone oak fern	*Gymnocarpium robertianum*	IL E
Louisiana waterthrush	*Seiurus motacilla*	
Mountain maple	*Acer spicatum*	
Mountain mint	*Pycnanthemum virginianum*	
Mouse-ear chickweed	*Cerastium arvense*	
Multiflora rose	*Rosa multiflora*	
Musclewood	*Carpinus caroliniana*	
Needle grass	*Stipa spartea*	
Northern lungwort	*Mertensia paniculata*	I E
Northern monkshood	*Aconitum noveboracense*	F T, I T, W T, O E, NY T
Occult vertigo	*Vertigo occulta*	I T
Pale lobelia	*Lobelia spicata*	
Paper birch	*Betula papyrifera*	
Prairie dropseed	*Sporobolus heterolepis*	
Prairie rose	*Rosa carolina*	
Prairie thimbleweed	*Anemone cylindrica*	
Prairie violet	*Viola pedatifida*	
Prickly ash	*Xanthoxylum americanum*	
Prickly rose	*Rosa acicularis*	I E, IL E

Plant List for Driftless NWR (Continued)

Common name	Scientific name	Status*
Purple prairie clover	*Petalostemum purpureum*	
Quaking aspen	*Populus tremuloides*	
Red oak	*Quercus rubra*	
Red-berried elder	*Sambucus racemosa*	
Rigid goldenrod	*Solidago rigida*	
Rose twisted stalk	*Streptopus rosius*	
Shagbark hickory	*Carya ovata*	
Showy lady's slipper	*Cypripedium reginae*	I T, IL E
Side-oats grama	*Bouteloua curtipendula*	
Slippery elm	*Ulmus rubra*	
Stinging nettle	*Urtica dioica*	
Sugar maple	*Acer saccharum*	
Sullivantia	*Sullivantia sullivantii*	M T, IL T
Sumac	*Rhus typhina or R. glabra*	
Touch-me-not	*Impatiens pallida*	
Twinflower	*Linnaea borealis*	I T
Twinleaf	*Jeffersonia diphylla*	I T
Western yarrow	*Achillea millefolium*	
White prairie clover	*Petalostemum candidum*	
Wood Nettle	*Laportea canadensis*	
Woodrush	*Luzula acuminata*	

* Threatened and endangered status: F=Federal, I=Iowa, IL=Illinois, M=Minnesota, O=Ohio, NY=New York, W=Wisconsin. T=threatened, E=endangered

Snails, Mammals, Reptiles, and Turtles of Driftless NWR

Common name	Scientific name	Status*
Bluff vertigo snail	*Vertigo meramecensis*	S E, M T
Briarton pleistocene vertigo snail	*Vertigo brierensis*	S E
Minnesota pleistocene ambersnail	*Novisuccinea Sp A*	I E, M T
Iowa Pleistocene ambersnail	*Novisuccinea Sp B*	I E,M E
Iowa Pleistocene snail	*Discus macclintocki*	F E, I E, IL E
Iowa Pleistocene vertigo snail	*Vertigo iowensis*	I E
Coyote	*Canis latrans*	
Snapping turtle	*Chelydra serpentina*	
Timber rattlesnake	*Crotalus horridus*	M T, IL T

Appendix D: Compatibility Determinations

DRAFT COMPATIBILITY DETERMINATION

Use: Cooperative Farming for Habitat Restoration

Station Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

Most lands acquired for the Refuge have been previously farmed, grazed, or logged. Invasive species are present on most Refuge units because of past disturbances to the native plant community. The majority of the Refuge lands are, or were historically hardwood forest. The Refuge's goal is to restore as much habitat as possible to quality, presettlement habitat types.

Cooperative farming is the term used for cropping activities (producing grain crops) done by a third party on land that is owned by the Service in fee title or controlled by the Service through a restrictive easement. This type of activity is usually done on a short-term basis (3 years or less) to prepare an optimum seed bed for the establishment of native prairie or hardwood forest species.

The cropping is done under the terms and conditions of a Cooperative Farming Agreement or Special Use Permit issued by the Refuge Manager. The terms of the Agreement or Permit ensure that all current Service and Refuge restrictions are followed.

Cooperative farming activities are conducted only on previously disturbed areas that have unacceptable levels of chemical residue, noxious weeds, or non-native plant species or ecotypes or to honor the land use clauses of a purchase agreement. To ensure that all Service policies are met, all such land use clauses must be approved by the Refuge Manager prior to Service acceptance of the purchase agreement.

Current and anticipated future Refuge units average less than 200 acres in size and are intermingled with private and other public lands. Although the specific acreage of fields to be cooperatively farmed vary by unit, they typically range from 5 to 50 acres. The fields are typically planted to corn or soybeans. Alfalfa used for hay currently is planted on one field. Haying is expected to be minimal on current or future lands. The Refuge is not in a high grassland bird nesting area, although some nesting by songbirds probably occurs in hay fields. Haying will be delayed until June 30 or later under the cooperative farming agreements.

Availability of Resources:

The needed staff time for development and administration of cooperative farming programs is available. Most of the needed work to prepare for this use would be done as part of routine management duties. The decision to use a cooperative farmer would occur as part of strategies developed under habitat restoration and management discussions. The additional time needed to coordinate issuance and oversight of the needed Special Use Permit or Cooperative Farming Agreement is relatively minor and within existing Refuge resources.

The cooperative farming of Service land will, in most cases, not generate income for the Service. In accordance with Service policy, any income is submitted for deposit in the Refuge Revenue Sharing Account and is not available at the Refuge level to offset station costs incurred in administration of this use. However, all Service employees involved in the administration of the program must be sensitive to the primary purpose of cooperative farming: providing an optimum planting bed for native plant species. The Service should receive a fair market value from cooperative farmers, but generation of income is a secondary consideration when developing the terms and conditions of a cooperative farming agreement. The terms of the agreement may include other options as described by Service policy.

To lessen any appearance of favoritism or impropriety, District Managers should document how cooperators were selected and how rental rates were derived (see Refuge Manual).

Anticipated Impacts of the Use:

Cooperative farming to prepare suitable seed beds for native plantings will result in short-term disturbances and long-term benefits to both resident and migratory wildlife using the Refuge. Most of the fields have previously been in crop production. Short-term impacts include disturbance and displacement typical of any noisy heavy equipment operation. Cropping or haying activities in old fields or abandoned croplands will also result in short-term loss of habitat for any animal or insect species using those areas for shelter, nesting, feeding, or perching. Long-term benefits are extremely positive due to establishment of food and cover resources for a variety of wildlife. Restoration of forest or grassland will also reduce fragmentation of habitats in the area. The resulting habitat will greatly improve conditions for most of the same species affected by the short-term negative impacts. Restored habitat will provide improved buffer areas to endangered species habitat by reducing erosion effects on sinkholes, ravines, and streams. Strict time constraints placed on this use will limit anticipated impacts to these relatively minor areas.

Public Review and Comment:

During the Scoping phase of the preparation of the Comprehensive Conservation Plan (CCP), four open houses were held to solicit public input and comment on all aspects of Refuge management. No comments were received on cooperative farming. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination:

____ Use is Not Compatible
__X__ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Cooperative farming agreements will be limited to 4 years or less, unless funds for restoration are not available, and comply with all appropriate Service regulations on chemical application and use. Chemical application will not occur near endangered species habitat.

2. Haying will occur after June 30.

Justification:

The cooperative farming of previously disturbed areas that are owned or under easement by the Service and have unacceptable levels of chemical residue, noxious weeds, or non-native plant species or ecotypes, or are being farmed to honor the land use clauses of a purchase agreement to prepare an optimum seed bed for the establishment of native plant species, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the Refuge for the following reasons:

1) Only areas that have already been significantly manipulated or altered by cropping or grazing activities will be affected. These areas contain few if any native plants and offer extremely limited value to the ecological integrity of the unit or landscape.

2) Cooperative farming activities in most cases provide the fastest, most cost effective way to establish native prairie or forest species on areas that have unacceptable levels of chemical residue, noxious weeds, or non-native plant species or ecotypes. Refuge staff could complete all work, but for most instances that would required additional equipment and/or staff to efficiently break up non-native brome sod, or to cultivate and control weeds on small, widely scattered tracts of land. Hiring contractors to do this work at rates that can approach $100/acre is a possibility, but would require additional funds. By using local farmers to conduct these farming activities, Refuge budget and staff time can be better allocated to completing the needed restoration (seeding of native grasses and forbs or planting trees) on lands that have completed the farming cycle and are in good condition for seeding.

3) Short-term impacts of farming small tracts of land are minor. No wildlife or habitat losses occur when land purchased in row crop is farmed for an additional period of 2-3 years. Low quality grasslands that are farmed as a first step to conversion to higher-value native habitats will result in habitat loss for trust resources during the farming period. The long-term benefits to the ecological integrity of the Refuge and landscape by restoring these degraded or row cropped areas to native plant species are significant and exceed the short-term losses incurred through the cropping process. This restoration will also benefit endangered species by reducing erosion potential near algific slope habitat, and enhancing microclimate factors important to maintaining cold conditions on the algific slopes.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: 2020

DRAFT COMPATIBILITY DETERMINATION

Use: Interpretation and Environmental Education

Station Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

To allow wildlife interpretation and environmental education programs to be conducted on specified Refuge units. Formal programs include activities prepared, scheduled, and organized for school-aged children and organized groups by U.S. Fish and Wildlife Service staff. At this time, there are no formal curriculums or program schedules. Programs and presentations are given upon request as staff time allows and typically address endangered species and wildlife habitats. Some programs have occurred on the Refuge, but most are off Refuge. Currently, on-refuge tours are 1-5 per year and off-Refuge programs are 3-6 per year. As additional staff is added in the future, programs and curriculums will be designed to provide environmental education and interpretation primarily addressing endangered species. Environmental education will primarily be off site, but some may occur at the Howard Creek unit and other suitable units as they are added to the Refuge. We have a goal of conducting at least 10 environmental education programs per year in the future. A self guided trail may be added to the Howard Creek unit in the future. Informal programs could include self guided nature trails, impromptu presentations and discussions of wildlife conservation issues with interested citizens, casual visitors, and unscheduled groups. The visitation and use of a Refuge Unit by local educators and their classes on their own for the purposes of furthering their understanding of natural resource management issues would also classified as an informal program.

In addition, this use includes the development of indoor interpretive areas within the Visitor Contact Station. There are many purposes for these exhibits, including telling the story of endangered species conservation and the National Wildlife Refuge System.

Availability of Resources:

Staff is currently limited to one Refuge Operations Specialist for limited amount of interpretation and environmental education programming. There is no funding specific to this activity. An interpretive park ranger position would be added and shared with the McGregor District of Upper Mississippi River National Wildlife and Fish Refuge according to the Comprehensive Conservation Plan. Currently, however, staffing levels and funding are not adequate to fully capitalize on the opportunities to interpret wildlife conservation issues within these rural communities. The Comprehensive Conservation Plan details the needed funding and staff to bring these programs up to Service standards.

Anticipated Impacts of the Use:

The overall impacts to the Refuge and endangered species or other wildlife populations from this use will be minimal. This use will likely only occur on the Howard Creek unit of the Refuge and possibly a few additional, suitable units as acquired in the future. This use is likely to be beneficial in gaining support for the Refuge's endangered species protection efforts. There could be some occasional disturbance to wildlife from groups being on the Refuge. School buses and personal vehicles will utilize parking areas and access trails already constructed for other activities such as use by hunters and Service employees conducting habitat management activities. The limited number of nature trails that will be developed will minimize disturbance to vegetation and wildlife use of these areas.

Public Review and Comment:

Four open houses were held in preparation for the Comprehensive Conservation Plan for the Refuge. Public comments have also been solicited about Service operations including public use programs such as interpretation and environmental education. The public expressed a desire for increased education about the Refuge and endangered species. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination:

____ Use is Not Compatible

__X__ Use is Compatible With Following Stipulation

Stipulation Necessary to Ensure Compatibility:

1. Endangered species locations will be closed to all public entry.

2. The manager will monitor use patterns and densities and make adjustments in timing, location and duration as needed to limit disturbance.

Justification:

We find this use to be compatible because:

The majority of the use will take place off-Refuge in classrooms or other settings.
On-Refuge use will occur at only 1-2 of the Refuge units.
Endangered species locations are protected by being closed to all public entry.
Short-term impacts could occur from tours, but long-term impacts are unlikely.
The resources to administer this use are available.
Stipulations are in place to minimize negative impacts to habitat or listed species. A Section 7 consultation has been completed.
Law enforcement will occur and the amount of use (i.e. self guided trails) will be monitored.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: 2020

DRAFT COMPATIBILITY DETERMINATION

Use: Recreational Fishing

Refuge Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

Allow public fishing on the Fern Ridge and Steeles Branch units of the Refuge in accordance with State regulations and seasons. Both of these units provide stream fishing only. They are not designated trout waters. Iowa recreational fishing regulations allow the traditional taking of game fish species with rod and reel from shore, a boat or through the ice, removal of rough fish by spear, archery, snagging, and hand fishing as well as the taking of limited quantities of mussels, crayfish, frogs, minnows and turtles for personal use. The number of people fishing on the Refuge is currently few and is not expected to increase substantially. All forms of fishing or entry on all or any part of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions of, or affecting land, water, vegetation, or wildlife populations. Lands acquired in the future may be opened to fishing if sufficient public access and buffer acreage around endangered species habitat exists.

The Fern Ridge unit is 207 acres and the Steeles Branch unit is 15 acres. Both are surrounded by private land and access to the Steeles Branch unit is through private land. The north boundary line of the unit lies at the midpoint of Steeles Branch creek. Dry Mill creek runs along the north boundary of the Fern Ridge unit and has access from a public road. The State of Iowa manages the fishery resources in these local streams and rivers.

Availability of Resources:

There are no facilities for the public at either of these units. Signage is provided by the Refuge. Given the light fishing pressure, current Refuge staff are deemed adequate to administer and enforce laws related to fishing. Additional resources would be required to open other units as acquired.

Anticipated Impacts of the Use:

Endangered species habitat exists adjacent to the streams where fishing may occur. These areas are posted as closed to all public entry. Endangered species habitat is steep and rocky and relatively inaccessible. It is unlikely that someone who is fishing would travel into these closed areas. Fishing activities and harvest of other aquatic species may cause temporary disturbance to wildlife. This

disturbance may displace individual animals to other parts of the unit, or onto private land. However, this disturbance will be limited in scope and duration due to the small amount of use and access limited to foot travel.

Public Review and Comment:

During drafting of the Comprehensive Conservation Plans four open houses were held and written comments were solicited from the public about Refuge operations including public use programs such as fishing. Comments were received, compiled and addressed as issues in the Plan as well as the Environmental Impact Statement. No comments regarding fishing were received. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Endangered species locations are closed to all public entry.

2. Use hours are from one hour before sunrise to one hour after sunset.

3. The level of all public uses will be monitored and restricted if adverse impacts are detected.

4. All applicable State and Federal regulations will apply.

Justification:

We determine this use to be compatible because:

The amount of use is very low and confined to two of nine units.
Endangered species locations are protected by being closed to all public entry.
Short-term impacts could occur, but long-term impacts are very unlikely.
This use will not have an overall impact to the fishery resource.
The resources to administer this use are available.
Stipulations are in place to minimize negative impacts to habitat or listed species. A Section 7 consultation has been completed.
Law enforcement will occur and the amount of use will be monitored.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: 2020

DRAFT COMPATIBILITY DETERMINATION

Use: Hunting of Resident Game

Station Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

Allow public hunting of resident game including white-tailed deer and upland game on specified Refuge units. All endangered species locations are closed to all public entry including hunting. The Howard Creek and Fern Ridge Units of the Refuge will be open to public hunting. Hunting may be allowed on additional suitable units acquired in the future. Hunting is currently light with most use by bow hunters. It is expected to increase slightly as hunters learn what areas are available. However, the number of hunters is expected to be small. All other Refuge units are closed to all entry, but may be opened for special public hunts if extraordinary circumstances are present (such as habitat damage by wildlife or disease). All forms of hunting or entry on all or any part of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions of, or affecting land, water, vegetation, or wildlife populations. Lands acquired in the future may also be opened to hunting when there is sufficient public access and buffer acreage around endangered species habitat.

Hunting is in accordance with state regulations and seasons and the following special regulations:

Upland game and big game hunting are allowed beginning November 1 until the close of the state hunting seasons or January 15, whichever occurs first.
Use is allowed from one hour before sunrise to one hour after sunset.
Archery and muzzleloader hunting only are allowed for deer.
Permanent blinds, platforms, or ladders are not allowed. All stands must be removed following each day's hunt.
In areas posted "area closed", all public entry is prohibited.
Deer drives are allowed only during lawful party hunting conducted within the Refuge, in accordance with state regulations. Driving deer from or through the Refuge to any persons hunting outside the Refuge boundary is prohibited.
Only approved nontoxic shot is allowed in possession.
Spring turkey hunting is not allowed.
Trapping is not allowed.

The Howard Creek unit is 209 acres and the Fern Ridge unit is 207 acres. Both contain forest, grassland, and riparian habitats. They are surrounded by privately owned land. The State of Iowa

manages resident game over these broad landscapes and maintains healthy populations by allowing harvest of surpluses though recreational hunting.

Availability of Resources:

The two units on which hunting is permitted were opened to hunting in 1994. The Refuge has the resources to manage hunting on areas currently open. The Refuge Operations Specialist handles administration and monitoring. Law enforcement duties are shared with the McGregor District of Upper Mississippi River National Wildlife and Fish Refuge. Additional resources may be needed if additional acquired lands are opened to hunting in the future.

Brochures with the regulations are available at the McGregor District Visitor Contact Station. Public use regulation signs were posted in 2001 on units open to hunting. Maps are available upon request. An information kiosk and parking area were recently added at the Howard Creek unit.

Anticipated Impacts of the Use:

Hunting has occurred on two Refuge units since 1994 with no known impacts to endangered species or other wildlife. Use has been primarily by deer bow hunters and pheasant hunters. Overall use by hunters is low. Installation and use of parking areas and access trails will result in minimal impacts as these parking areas and trails are used by hunters as well as by Service employees conducting refuge management activities. Although hunting causes mortality and temporary disturbance to wildlife, maintaining populations within the carrying capacity of existing habitat ensures long-term health and survival of the species. Hunting occurs well after the breeding season for birds so no disturbance to nesting is anticipated. Deer populations have been high for several years in northeast Iowa and on the Refuge. There is a current need to reduce the local deer population to minimize adverse impacts to habitat.

Public Review and Comment:

During drafting of the Comprehensive Conservation Plans four open houses were held and written comments were solicited from the public about Refuge operations, including public use programs such as hunting. The public expressed interest in maintaining hunting on these areas and providing more information regarding regulations. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Nontoxic shot only may be possessed in accordance with current regulations.
2. Use of motorized vehicles is prohibited except by permit or in designated parking areas, access trails or public roads.
3. Use hours are one hour before sunrise to one hour after sunset.
4. Endangered species locations are closed to all public entry.
5. The level of all public uses will be monitored and restricted if adverse impacts are detected.
6. All applicable State and Federal Regulations will apply.

Justification:

We find hunting to be compatible because:
Use levels are light and only occur on two of nine units.
Endangered species locations are protected by being closed to all public entry.
Hunting does not negatively affect wildlife populations, and removal of deer will likely benefit habitats.
Short-term impacts could occur, but long-term impacts are unlikely.
The resources to administer this use are available.
Stipulations are in place to minimize negative impacts to habitat or listed species. A Section 7 consultation has been completed.
Law enforcement will occur and the amount of use will be monitored.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: 2020

DRAFT COMPATIBILITY DETERMINATION

Use: Wildlife Observation and Photography (Including the means of access such as hiking, snowshoeing, cross-country skiing, and canoeing)

Refuge Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

Allow general public access during anytime of the year to the Howard Creek and Fern Ridge units of the Driftless Area National Wildlife Refuge for the observation and photography of associated flora and fauna. Wildlife observation and photography may occur on newly acquired lands when there is sufficient access and buffer area surrounding endangered species habitat. Endangered species locations are closed to all public entry. All other Refuge units are closed to public entry. Allowable forms of access to open units include hiking, snowshoeing, cross-country skiing, and canoeing. Bicycles, motorized vehicles, and horses are not allowed. There is a low amount of wildlife observation and photography currently occurring on the Refuge. Refuge staff has provided 1-4 tours per year for photographers who want to photograph rare plants. Entry on all or portions of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

These units are open all year from one hour before sunrise to one hour after sunset.

Availability of Resources:

Wildlife observation and photography require minimal facilities. These lands have been open for these uses for several years with no known impacts. There are no facilities at the Fern Ridge unit. An information kiosk and parking area were recently added to the Howard Creek unit. Signs are posted that say wildlife observation and photography are allowed at both units. A wildlife observation trail may be added to the Howard Creek unit in the future. This trail would go through prairie restoration areas and forest surrounding endangered species habitat. Law enforcement is provided by the Service to enforce regulations.

Anticipated Impacts on Refuge Purpose(s):

Wildlife observation and photography pose minimal impacts on the purposes for which the Refuge was established. Access is typically by individuals or small groups on foot. Damage to habitat by walking is minimal and temporary. Endangered species locations are posted as closed to all public entry. Although some photographers seek out the threatened Northern monkshood, it can be

photographed without traversing and disturbing the occupied habitat. Thus far, several photographers have requested tours to photograph monkshood and have been accompanied by Refuge staff. The specific locations of listed species are not given out except as shown when accompanied by Refuge staff.

There could be some temporary disturbance to wildlife due to human activity on the land. The most likely impact would be during spring and early summer nesting. But the expected sporadic and limited use by the public should not create unreasonable impacts. Winter activities pose no impacts to breeding wildlife and little impact to vegetation. The winter disturbance to resident wildlife is temporary and minor. Disturbance to wildlife, such as flushing a nesting bird, is inherent to these activities; however, the disturbance is temporary and generally not malicious. Any unreasonable harassment would be grounds for the manager to close the area to these uses or restrict the uses to minimize harm.

Access by motorized vehicles, bicycles, and horses is not allowed. Parking lots and access trails have minimal impacts because they are relatively small in size. They also allow for safe use of these public lands.

Use of these Refuge units thus far for the purpose of wildlife observation and photography is minimal. The amount of use could increase in the future, but is not expected to be large.

Public Review and Comment:

During drafting of the Comprehensive Conservation Plans four open houses were held and written comments were solicited from the public about Refuge operations including public use programs such as wildlife observation and photography. The public expressed interest in using these areas for wildlife observation and photography. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination:

_____ Use is Not Compatible

__X__ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- Certain modes of access such as motorized vehicle, bicycles, and horses are not allowed.
- Endangered species locations are closed to all public entry and posted as such.
- Use may only occur from one hour before sunrise to one hour after sunset.
- Camping, overnight use, and fires are prohibited.
- No photo or viewing blinds may be left over night.
- Collecting, harassment of wildlife, or excessive damage to vegetation is prohibited.
- The level of all public uses will be monitored.

Justification:

We find this wildlife observation and photography to be compatible because:

The level of use for wildlife observation and photography is small and the associated disturbance to wildlife is temporary and minor.
Only two of nine Refuge units are open to this use. This use may be allowed on additional land acquired in the future if the right conditions exist.

Endangered species locations are protected by being closed to all public entry.
The resources to administer this use are available, including limited tours to photograph or observe rare, threatened or endangered plants.
Stipulations are in place to minimize negative impacts to habitat or listed species. A Section 7 consultation has been completed.
Law enforcement will occur and the amount of use will be monitored.

Lands acquired in the future may also be opened to wildlife observation and photography if sufficient public access and buffer acreage around endangered species habitat exists.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10-year Re-evaluation Date:2020

DRAFT COMPATIBILITY DETERMINATION

Use: Research, monitoring, inventory by third parties

Refuge Name: Driftless Area National Wildlife Refuge

Establishing and Acquisition Authority(ies):

Endangered Species Act of 1973

Refuge Purpose(s):

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"...To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

Allow specific monitoring, inventory, and research on the Refuge by independent researchers. Algific talus slope habitat on the Refuge supports listed species and a unique biological community. The endangered Iowa Pleistocene snail and threatened Northern monkshood depend on the cold, moist algific talus slopes. Other rare and disjunct plants and snails, some of which are state listed or Service species of concern, also occur on this habitat. Monitoring or research of listed species or other ecologically important features will take place to answer specific management or recovery questions. Some examples are : determining the location and function of cold air flow through sinkholes, plant inventories, and determining the impacts of sun/shade on algific slopes. Research in other habitats may also occur to answer specific management or habitat restoration questions. Little research is currently occurring, but may increase because of the need to answer the above questions.

Research may involve scientific collecting of listed or other species. Research will be restricted to a specific number of people, number of sites, and number of visits to prevent damage to fragile endangered species habitat or other habitats on the Refuge. Special use permits will be issued by the Refuge as needed to manage independent researchers.

Availability of Resources:

Resources are available to issue special use permits and monitor their terms.

Anticipated Impacts of the Use:

Endangered species habitat is steep and rocky and relatively fragile. Persons traversing this habitat can dislodge rocks and soil, compact cold air vents, step on snails and plants, and spread invasive species. However, these impacts can be reduced or eliminated by using wildlife trails, keeping the number of people and visits to a minimum, and avoiding particularly fragile sites. Scientific collecting will be kept to a minimum and closely monitored as it could result in impacts to the populations. Appropriate federal and state permits would be needed for collecting.

Endangered species habitat on the Refuge is closed to all public entry. Efforts will be made to educate neighboring landowners and visiting public that may see researchers in closed areas as to the reason for their entry.

Impacts from research on other habitats on the Refuge may result in disturbance to wildlife, but will be minimal due to the duration of the study and stipulations outlined in a Refuge Special Use Permit.

Public Review and Comment:

During drafting of the Comprehensive Conservation Plans four open houses were held and written comments were solicited from the public about Refuge operations including the need for more information about algific talus slopes and associated species. Comments were received, compiled and addressed as issues in the Plan as well as the Environmental Impact Statement. The public suggested some needs for research or monitoring of algific talus slope habitat. Draft copies of the CCP, including this compatibility determination, will be available for public comment during a review period. Several additional public meetings will be conducted during this period.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- The number of persons accessing endangered species habitat for each study will be limited by a Refuge Special Use Permit.
- The number of visits to any particular site per year will be limited by a Refuge Special Use Permit.
- Research and monitoring will not be allowed on certain especially fragile sites or on the same sites year after year.
- Appropriate state and federal permits must be obtained for scientific collecting.
- An Endangered Species Act Intra-Service Section 7 consultation must be completed prior to research.

Justification:

We find this use compatible because:

- Access to endangered species habitat and research methods will be controlled through special use permits
- Short-term impacts could occur, but long-term impacts are unlikely.
- The resources to administer this use are available.
- Stipulations are in place to minimize negative impacts to habitat or listed species. A Section 7 consultation has been completed.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: 2020

DRAFT COMPATIBILITY DETERMINATION

Use: Firewood and commercial tree cutting for habitat management purposes

Station Name: Driftless Area National Wildlife Refuge (Refuge)

Establishing and Acquisition Authority:

Endangered Species Act of 1973

Refuge Purpose:

The purpose of Driftless Area National Wildlife Refuge (Refuge) is to conserve fish or wildlife listed as endangered or threatened species or plants (16 USC 1534 Endangered Species Act of 1973).

NWRS Mission:

"The Mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Use:

What
The Refuge will allow cutting and removal of trees (tree harvest) from the Refuge for the purpose of habitat management. These activities include harvest of standing and fallen trees by individuals for personal use firewood, and commercial timber harvest. Removal of trees that are a hazard to property and human safety will be permitted in specific circumstances. This use has not previously occurred on the Refuge and will only occur after forest inventories and management plans have been completed for each Refuge unit. Selective tree harvest will generally be on small areas and may consist of removing maples or other trees to create openings for oak regeneration and growth.

Where, Habitat, Proportion of habitat
Tree harvest will be considered and may be permitted within most forested areas (535 acres) of the Refuge, except on endangered species habitat. The existing forest is primarily oak/hickory and maple/basswood associations. Other common tree species include: walnut, hackberry, ash, elm, and ironwood. Nearly all forest on the Refuge has been impacted by logging and grazing within the last 10 to 50 years. The areas open to tree harvest and management strategies will be specified in a Forest Management Plan. Additional forested lands may be acquired in the future for which management plans would be completed. It is anticipated that harvest would occur on only small areas for a specific management purpose.

Key Species
Most wildlife species in the area of harvest may be temporarily affected by tree harvest activities. Key cavity nesting species are pileated and other woodpeckers, wood ducks, and screech owls. Many other bird species utilize forested habitat to nest, roost, seek cover, or feed. Examples of important species include: bald eagles, owls, warblers and other passerine bird species, and wild turkeys. Resident mammals such as fox squirrels, deer, and raccoons also use forested habitats.

Why is the use proposed
The primary goal of forest management is to improve habitat for migratory birds, in particular songbirds. Restoring Refuge forests to valuable wildlife habitat may require selective cutting of trees to allow more light to penetrate the forest for regeneration and growth of oaks and other

species. Diseased and storm damaged trees may need to be removed to improve regeneration or to allow access to sites for management.

Firewood cutting and commercial timber cutting are not priority public uses as identified in the Refuge Improvement Act.

When
Tree harvest will typically occur from late fall through early spring, when frozen ground surface allow equipment access, and wildlife disturbance will be minimized. Some small scale personal use tree harvest may be permitted during other periods depending on circumstances.

How would the use be conducted
Administration of personal use firewood programs and commercial tree harvest activities will be conducted in accordance with a Forest Management Plan. The Forest Management Plan will address all aspects of forest management; such as, goals, objectives, strategies, information needs, management units, methods, permittee selection, and interagency coordination. The Iowa DNR has an active forest management program in northeast Iowa and may provide technical assistance for planning and harvest.

Techniques
Specific management techniques will be addressed in the Forest Management Plan. In general, management goals will focus on: inventory of the existing forest, restoration of previously forested areas, regeneration within existing forest, creation or enhancement of the forest. Potential techniques include: shelterwood harvest, seed tree harvest, single tree and group selection, tree planting, herbicide application, prescribed fire.

Number of people involved
The number of permittees during any one time period will vary, depending on planning and funding constraints, and resultant number of active management units, and to some extent, market interest. We estimate that one to two commercial permits (sales) may be active at one time. Interest in personal use firewood is currently low, but is expected to fluctuate depending on the cost of home heating fuels. The activity of personal use firewood permittees is also frequently influenced by location of available wood and ease of access.

Supporting Facilities
Existing facilities and other infrastructure are currently sufficient to accommodate this use.

Availability of Resources:
Some initial increase in Refuge operations for development and review of policy, planning, and procedures will occur. Once forest management plans are in place, it is likely that one to two permits annually will be issued. There may be some years in which permits are not issued. Therefore, administration and enforcement of permits will be part of routine management. The number of permits may increase as additional land is acquired in the future. In this case, the costs of additional administrative needs should be recouped from permit fees.

Anticipated Impacts of the Use:
Potential adverse impacts include: short term loss of site specific forest habitats; increased fragmentation of landscape and reduced productivity of nesting birds; loss of snags for cavity nesting birds and loss of large mature and over-mature trees; loss of dead whole trees on the ground; soil disturbance which invites exotic plant invasion; damage to roads and other habitats from equipment; damage to cultural resources; reduced visual esthetics; disturbance to wildlife and visitors from equipment.

Potential positive impacts include: restoration, maintenance and enhancement of forest habitats; increased or maintained forest habitat (age class and species) diversity.

Public Review and Comment:
This Compatibility Determination will be submitted as a portion of the Refuge Draft Comprehensive Conservation Plan and Environmental Impact Statement. Public involvement includes a notice of availability, comment period, media announcements, distribution to the Refuge mailing list, and a series of public meetings in selected communities adjacent the Refuge.

Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations:

Stipulations Necessary to Ensure Compatibility:
Project stipulations will be established for each project as site specific conditions require. Examples of possible conditions include: limit tree harvest to winter months to reduce soil and wildlife disturbance, require archeological surveys with State Historic Preservation programs; establish maximum cut area size.

Justification:

We find tree harvest and wood cutting compatible because:

- Tree cutting will be conducted in accordance with a Forest Management Plan which will identify management units, desired habitat goals/objectives, and management strategies, thus ensuring best management practices and successful outcome.
- These activities will occur only periodically on a small portion of the refuge. Short term adverse effects on habitat caused by properly applied logging practices are offset by long term habitat improvement.
- No harvest will occur on or immediately adjacent to endangered species habitat.
- Tree cutting planning and practices will be conducted so as to promote forest age and species diversity, and spatially placed to minimize impacts to Refuge units.
- Constraints regarding location and timing of logging will reduce adverse impacts on affected species and habitat.

Signature: Project Leader _____
(Signature and Date)

Concurrence: Regional Chief _____
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date:____2020_____

Appendix E: Refuge Operations Needs (RONS) and Maintenance Management System (MMS)

Refuge Operations Needs (RONS) and Maintenance Management System (MMS)

Refuge Operations Needs (RONS)

RONS Project No.	Strategy No.	Project Description	First Year Need	Recurring Annual Need
01001	2.4.4.1 obj. 1, stragegy 7. Also would assist with other objectives	endangered species monitoring (biologist)	128,000	128,000
Total			$128,000	

Deferred Maintenance and Equipment Needs (MMS)

MMS	Refuge Rank	Strategy No.	Project Description	Fund Type	Year	Cost
04001	1	2.4.4.1 #2	Replace 60,000 linear feet of barbed wire fencing	DM	2004	34,000
04002	2	2.4.4.3 #7	Revised Visitor Center display	DM	2004	52,000
04100	3	2.4.4.3 #6	Construct accessible hiking trails and wildlife interpretive facilities	SC	2004	313,000
01001	4	All	Replace chevy cargo truck	SE	2004	23,000
00468	1	All	Replace McGregor District office/shop facility Combined with McGregor District	LC	2004	2,297,000

Appendix F: Compliance Requirements

Appendix E / Compliance Requirements

Rivers and Harbor Act (1899) (33 U.S.C. 403): Section 10 of this Act requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States.

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a Federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, Federal or non Federal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Fish and Wildlife Coordination Act (1934), as amended: Requires that the Fish and Wildlife Service and State fish and wildlife agencies be consulted whenever water is to be impounded, diverted or modified under a Federal permit or license. The Service and State agency recommend measures to prevent the loss of biological resources, or to mitigate or compensate for the damage. The project proponent must take biological resource values into account and adopt justifiable protection measures to obtain maximum overall project benefits. A 1958 amendment added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs. It also authorized the Secretary of Interior to provide public fishing areas and accept donations of lands and funds.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Historic Sites, Buildings and Antiquities Act (1935), as amended: Declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. Provides procedures for designation, acquisition, administration, and protection of such sites.

Refuge Revenue Sharing Act (1935), as amended: Requires revenue sharing provisions to all fee-title ownerships that are administered solely or primarily by the Secretary through the Service.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act (1948): Provides that upon a determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

Federal Records Act (1950): Directs the preservation of evidence of the government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Wilderness Act (1964), as amended: Directed the Secretary of Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress. The Secretary of Agriculture was directed to study and recommend suitable areas in the National Forest System.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

National Wildlife Refuge System Administration Act (1966), as amended by the National Wildlife Refuge System Improvement Act (1997)16 U.S.C. 668dd668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, or environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Historic Preservation Act (1966), as amended: Establishes as policy that the Federal Government is to provide leadership in the preservation of the nation's prehistoric and historic resources.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major Federal action significantly affecting the quality of the human environment.

Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended: Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

Endangered Species Act (1973): Requires all Federal agencies to carry out programs for the conservation of endangered and threatened species.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Archaeological and Historic Preservation Act (1974): Directs the preservation of historic and archaeological data in Federal construction projects.

Clean Water Act (1977): Requires consultation with the Corps of Engineers (404 permits) for major wetland modifications.

Surface Mining Control and Reclamation Act (1977) as amended (Public Law 95-87) (SMCRA): Regulates surface mining activities and reclamation of coal-mined lands. Further regulates the coal industry by designating certain areas as unsuitable for coal mining operations.

Executive Order 11988 (1977): Each Federal agency shall provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains.

Executive Order 11990: Executive Order 11990 directs Federal agencies to (1) minimize destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

Executive Order 12372 (Intergovernmental Review of Federal Programs): Directs the Service to send copies of the Environmental Assessment to State Planning Agencies for review.

American Indian Religious Freedom Act (1978): Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Fish and Wildlife Improvement Act (1978): Improves the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out a volunteer program.

Archaeological Resources Protection Act (1979), as amended: Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Federal Farmland Protection Policy Act (1981), as amended: Minimizes the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

Emergency Wetlands Resources Act (1986): Promotes the conservation of migratory waterfowl and offsets or prevents the serious loss of wetlands by the acquisition of wetlands and other essential habitats.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

Americans With Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Executive Order 12898 (1994): Establishes environmental justice as a Federal government priority and directs all Federal agencies to make environmental justice part of their mission. Environmental justice calls for fair distribution of environmental hazards.

Executive Order 12996 Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the System.

Executive Order 13007 Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

National Wildlife Refuge System Improvement Act (1997): Considered the "Organic Act of the National Wildlife Refuge System. Defines the mission of the System, designates priority wildlife-dependent public uses, and calls for comprehensive refuge planning.

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act (1998): Amends the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

National Trails System Act: Assigns responsibility to the Secretary of Interior and thus the Service to protect the historic and recreational values of congressionally designated National Historic Trail sites.

Treasury and General Government Appropriations Act of 2001 (Public Law 106-554): In December 2002, Congress required federal agencies to publish their own guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information that they disseminate to the public (44 U.S.C. 3502). The amended language is included in Section 515(a). The Office of Budget and Management (OMB) directed agencies to develop their own guidelines to address the requirements of the law. The Department of the Interior instructed bureaus to prepare separate guidelines on how they would apply the Act. The U.S. Fish and Wildlife Service has developed "Information Quality Guidelines" to address the law.

Appendix G: List of Initialisms and Acronyms

List of Acronyms and Abbreviations

BCA	Bird Conservation Area
CCP	Comprehensive Conservation Plan
DANWR	Driftless Area National Wildlife Refuge
DNR	Department of Natural Resources
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FMP	Fire Management Plan
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
GPRA	Government Performance and Results Act
INHF	Iowa Natural Heritage Foundation
LPP	Land Protection Plan
NWR	National Wildlife Refuge
PPP	Preliminary Project Proposal
ROD	Record of Decision
TNC	The Nature Conservancy
UMRNWFR	Upper Mississippi River National Wildlife and Fish Refuge
USDA	U.S. Department of Agriculture

Appendix H: Mailing List

Mailing List

Elected Federal Officials

- U.S. Senator Richard Durbin (IL)
- U.S. Senator Peter Fitzgerald (IL)
- U.S. Senator Charles Grassley (IA)
- U.S. Senator Tom Harkin (IA)
- U.S. Senator Norm Coleman (MN)
- U.S. Senator Mark Dayton (MN)
- U.S. Senator Russ Feingold (WI)
- U.S. Senator Herb Kohl (WI)
- U.S. Representative Philip Crane (IL)
- U.S. Representative Lane Evans (IL)
- U.S. Representative Dennis Hastert (IL)
- U.S. Representative Donald Manzullo (IL)
- U.S. Representative Tom Latham (IA)
- U.S. Representative Jim Nussle (IA)
- U.S. Representative Gil Gutknecht (MN)
- U.S. Representative Mark Kennedy (MN)
- U.S. Representative Ron Kind (WI)

Elected State Officials

- State Senator Denny Jacobs (IL)
- State Senator Todd Sieben (IL)
- State Senator Mike Connolly (IA)
- State Senator E.T. Gaskill (IA)
- State Senator Kitty Rehberg (IA)
- State Senator Julie Hosch (IA)
- State Senator Bryan Sievers (IA)
- State Senator Roger Stewart (IA)
- State Senator Mark Zieman (IA)
- State Senator Bob Kierlin (MN)
- State Senator Steve Murphy (MN)
- State Senator Ron Brown (WI)
- State Senator Mark Meyer (WI)
- State Senator Dale Schultz (WI)
- State Representative Mike Boland (IL)
- State Representative Jim Sacia (IL)
- State Representative Patrick Verschoore (IL)
- State Representative Polly Bukta (IA)
- State Representative Chuck Gipp (IA)
- State Representative Pam Jochum (IA)

- State Representative Steven Lukan (IA)
- State Representative Pat Murphy (IA)
- State Representative Steven Olson (IA)
- State Representative Bob Osterhaus (IA)
- State Representative Roger Thomas (IA)
- State Representative Gregory Davids (MN)
- State Representative Jerry Dempsey (MN)
- State Representative Gene Pelowski (MN)
- State Representative Steve Sviggum (MN)
- State Representative Barbara Gronemus (WI)
- State Representative Mike Huebsch (WI)
- State Representative DuWayne Johnsrud (WI)
- State Representative Gabe Loeffelholz (WI)
- State Representative Jennifer Shilling (WI)

Federal Agencies

- U.S. Army Corps of Engineers
- U.S. Coast Guard
- "U.S. Department of Agriculture, Natural Resource Conservation Service"
- "U.S. Department of Interior, U.S. Fish & Wildlife Service"
- "U.S. Department of Interior, U.S. Geological Survey"
- U.S. Department of Transportation
- U.S. Environmental Protection Agency
- U.S. Forest Service

Native American Tribes

- Bad River Band, Chippewa
- Boise Forte Band, Chippewa
- Fond du Lac Band, Chippewa
- Grand Portage Band, Chippewa
- Lac Courte Oreilles Band, Chippewa
- Lac du Flambeau, Chippewa
- Leech Lake Band, Chippewa
- Mille Lacs Band, Chippewa"
- Red Cliff Band, Chippewa
- Red Lake Band, Chippewa
- Sandy Lake Band, Chippewa
- Sokaogon Chippewa
- Devils Lake (Spirit Lake) Sioux
- Flandreau Santee Sioux
- Lower Brule Sioux
- Lower Sioux Mdewakanton
- Prairie Island Sioux
- Santee Sioux
- Shakopee Mdewakanton Sioux

- Sisseton-Whapeton Sioux
- Upper Sioux Community
- Iowa Tribe of Kansas
- Iowa tribe of Oklahoma
- Menominee Indian Tribe
- Miami Tribe
- Stockbridge-Munsee
- Peoria Indian Tribe
- Citizen Potawatomi
- Forest County Potawatomi
- Hannahville Indian Community, Potawatomi
- Prairie Band of Potawatomi
- Sac & Fox Nation of Missouri
- Sac & Fox Tribe of the Mississippi
- Ho-Chunk Nation
- Winnebago Tribe of Nebraska

State Agencies

- Iowa Department of Natural Resources
- IowaHistorical Society
- Iowa Department of Cultural Affairs
- Illinois Department of Natural Resources
- Illinois Historic Preservation Division
- Minnesota Department of Agriculture
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Historical Society
- Minnesota Pollution Control Agency
- Minnesota Water & Soil Resource Board
- Wisconsin Department of Natural Resources
- Wisconsin Division of Tourism
- Wisconsin Department of Transportation
- Wisconsin Department of Agriculture, Trade

Cities

- Alma, Wisconsin
- Brownsville, Minnesota
- Cassville Village, Wisconsin
- Dubuque, Iowa
- Edgewood, Iowa
- Elkader, Iowa
- Fountain City, Wisconsin
- Garnavillo, Iowa
- Guttenberg, Iowa
- Harper's Ferry, Iowa

- Hokah, Minnesota
- La Crescent, Minnesota
- La Crosse, Wisconsin
- Lansing, Iowa
- McGregor, Iowa
- Monona, Iowa
- New Albin, Iowa
- Onalaska, Wisconsin
- Prairie du Chien, Wisconsin
- Stoddard, Wisconsin
- Trempealeau, Wisconsin
- Waukon, Iowa
- Winona, Minnesota

Counties

- Carroll, Illinois
- Jackson, Illinois
- JoDaviess, Illinois
- Rock Island, Illinois
- Whiteside, Illinois
- Allamakee, Iowa
- Clayton, Iowa
- Clinton, Iowa
- Dubuque, Iowa
- Houston, Minnesota
- Wabasha, Minnesota
- Winona County, Minnesota
- Buffalo, Wisconsin
- Crawford, Wisconsin
- Grant, Wisconsin
- La Crosse, Wisconsin
- Trempealeau, Wisconsin
- Vernon, Wisconsin

Organizations

- American Rivers
- Audubon Society
- Boy Scouts of America
- Izaak Walton League of America
- Sierra Club
- The Nature Conservancy
- The Wilderness Society
- Friends of the Upper Mississippi Refuges
- Sportsmen's Clubs (96)
- Businesses (45)

- Schools/Univ. (26)
- Libraries (34)

Other Organizations (54)

- River Associations and Committees (13)
- Lower Mississippi River Conservation Committee
- Midwest Area River Coalition 2000
- Mississippi River Basin Alliance
- Mississippi River Citizen Commission
- Mississippi River Interstate Cooperative Research Association
- Mississippi River Parkway Commission
- Mississippi River Regional Planning Commission
- Mississippi River Revival
- River Resource Alliance
- Upper Mississippi River Basin Association
- Upper Mississippi River Congressional Task Force
- Upper Mississippi River Conservation Committee
- Upper Mississippi Waterway Association

Media

- Newspaper (74)
- Radio (20)
- TV (16)

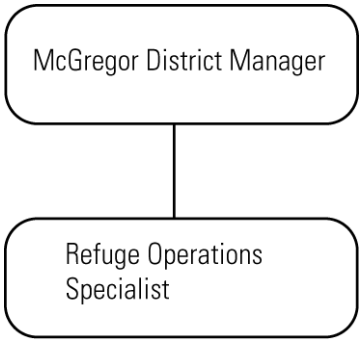
Citizens

- Illinois (274)
- Iowa (287)
- Minnesota (574)
- Wisconsin (928)
- Citizens in Other States (35)

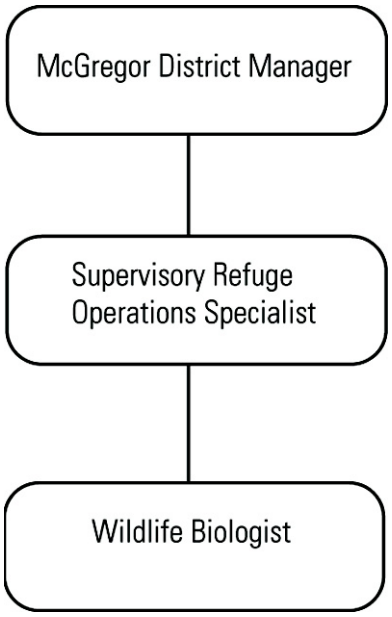
Appendix I: Refuge Staff Organization

Refuge Staff Organization

Current Staff Organization:



Future Staff Organization



Appendix J: Land Protection Plan

Driftless Area National Wildlife Refuge
Draft Land Protection Plan 2004

I. Project Description

Driftless Area National Wildlife Refuge (NWR) was established in 1989 under the authority of the Endangered Species Act of 1973 with the purchase of 139.3 acres in Clayton County, Iowa. The purpose of Driftless Area National Wildlife Refuge is to conserve fish or wildlife which are listed as endangered or threatened species (16 USC 1534 Endangered Species Act of 1973). The Refuge was specifically intended to protect lands for the federally endangered Iowa Pleistocene snail and threatened Northern monkshood. Refuge land acquisition is directly related to recovery plans for these two species that give permanent protection of remaining colonies as the primary recovery goal (U.S. Fish and Wildlife Service 1983, 1984). Tracts were purchased throughout the 1990s and two land exchanges were completed in 2001 and 2002 to bring the current Refuge acreage to 781.

The namesake of the Refuge, the Driftless Area, encompasses portions of Minnesota, Wisconsin, Iowa, and Illinois (Figure 1). The high topographic relief of the area, the varying slope angles and aspects, the karst features resulting from dissolution of underlying carbonate rocks, and the close approach of the Wisconsinan glaciers to the area have acted together to produce a variety of microclimates. These, in turn, support a number of rare species which are dependent upon unusual combinations of temperature and moisture.

Iowa Pleistocene snail
The Iowa Pleistocene snail (*Discus macclintocki*) was listed as endangered in 1977 because of the small number of populations, small total population, and its very restricted and fragile habitat type. It is also listed as endangered by the states of Iowa and Illinois. The U.S. Fish and Wildlife Service completed a recovery plan in 1984 written by Dr. Terry Frest. At that time the snail was known from 18 small sites in Clayton and Dubuque Counties, Iowa and Jo Daviess County, Illinois. Fossil records indicate that the snail was once widely distributed in the Midwest during the Pleistocene era (approximately 300,000-500,000 YBP). It is therefore considered a glacial relict species and its habitat is restricted to cold algific talus slopes (Figure 2). Threats to the species and its habitat listed in the recovery plan are human disturbance, logging, grazing, road building, quarrying, sinkhole filling, pesticides, house construction, and natural factors such as rock slides and stream undercutting or weather related factors. An additional, more recent potential threat is invasive species as well as increased development pressure since the 1980s.

The main features of the recovery plan are to gain management control of algific talus slopes where the snail occurs and protect them from human disturbances. Restoration and monitoring are also stated as being important. The Iowa Pleistocene snail can be considered for reclassification from endangered to threatened if permanent protection of 16 of the existing colonies can be achieved and documentation of stable or increasing populations can be done. Delisting can be considered if stringent protection of at least 24 or more sufficiently dispersed viable breeding colonies is achieved. A viable population from a genetic standpoint would be a breeding population of 500; however, further study regarding this number is needed. Dr. Frest (U.S. Fish and Wildlife Service 1984) states that it is likely other sites remain to be found. Indeed, further surveys by him and others in the 1980s discovered a new total of 37 sites in Clayton, Clinton, Fayette, Delaware, Dubuque, Jackson Counties, Iowa and JoDaviess County, Illinois.

Figure 1: Driftless Area NWR Acquisition Boundaries

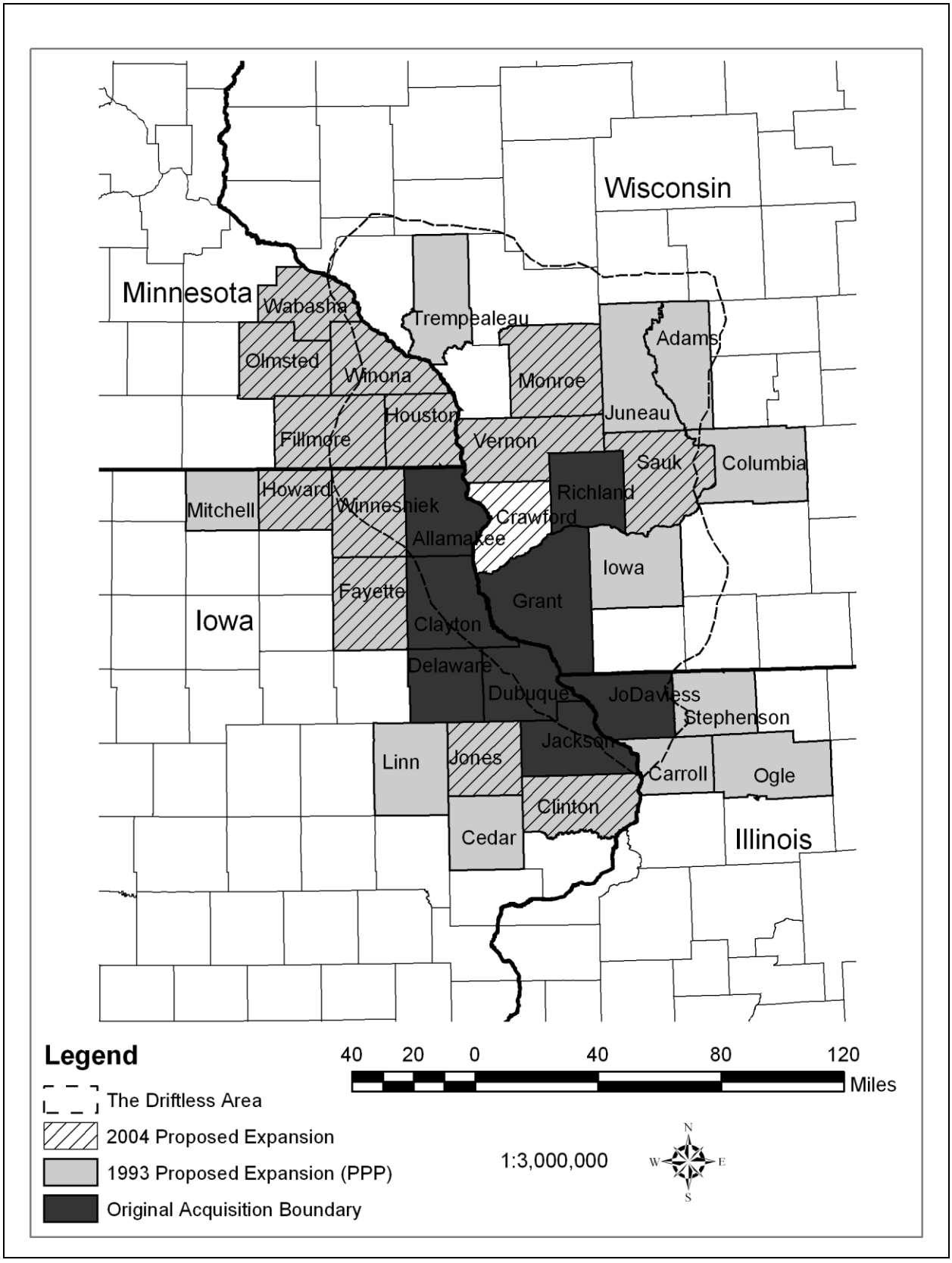
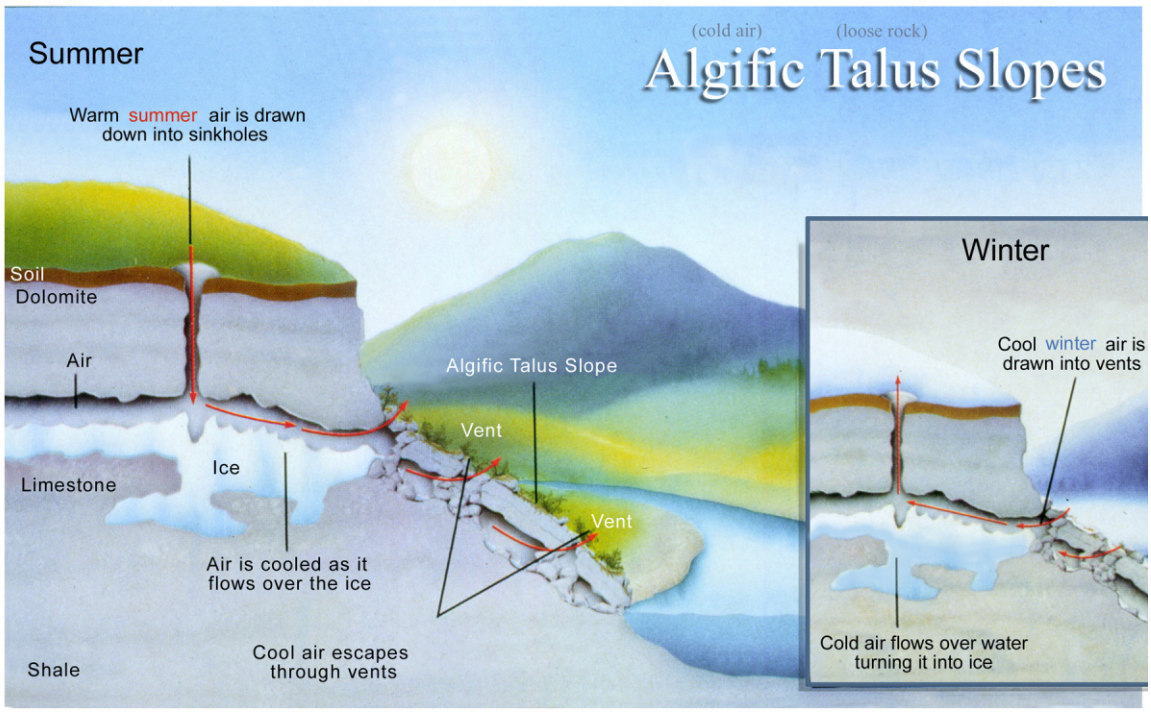


Figure 2: Algific Talus Slopes Illustrated



The basic premise of the recovery plan is to protect all of the sites with viable breeding colonies. Even though the number of sites has since increased, it still is not large and nearly all populations should be protected for delisting. The recovery plan needs updating to include all known sites, new monitoring information, and to refine downlisting and delisting criteria. Although 22 snail sites currently have some protection, 12 of these need additional protection of algific slopes and/or sinkholes to be considered fully protected for delisting purposes. Some of the largest populations are not protected and the species needs protection across its range to preserve genetic differences and to protect against catastrophic events in one area.

Northern monkshood

Northern monkshood (*Aconitum noveboracense*) was listed as threatened in 1978 because of its limited range and habitat preference. It is also listed as threatened by the states of Iowa, Wisconsin, and New York and endangered in Ohio. A recovery plan was completed in 1983. It was one of the first plant species listed under the Endangered Species Act. Monkshood requires a cold soil environment associated with cliffs, talus slope, algific slope, or spring/headwater stream situations. Its habitat is typically in rugged areas and on fragile cliffs or slopes that cannot tolerate a great deal of disturbance. In 1983, there were 24 sites known in Iowa, Wisconsin, Ohio, and New York. The authors acknowledged that Iowa had the greatest potential for discovery of new sites. There are now 83 known sites in Iowa, 18 in Wisconsin, two in New York, and one in Ohio. Sites vary greatly in population size from just a few plants to thousands of plants. Threats are dams and reservoirs, road construction, power line maintenance, logging, quarrying, grazing, developments, scientific overcollecting, and natural events. On algific slope sites, disturbance or filling of the sinkholes is also a threat. More recently, invasive species, and in particular garlic mustard, have become a threat as well. There is also a greater amount of development pressure in the region than in the 1980s.

The primary goal of the recovery plan is to provide a basis for delisting by providing security for all known northern monkshood locations against damage or destruction of the existing habitats. This security could be in various forms of acquisition, easement, fencing, landowner awareness. Additional goals were searches for new sites, much of which was completed in the 1980s, and propagation research.

This recovery plan also needs revision to include all of the known sites, more recent research, and more precise downlisting and delisting criteria. The viable population size for protection efforts needs to be determined. Currently there are 45 monkshood sites in some form of permanent protection. Some of these are small populations that may not be considered viable. Similar to snail sites, many of the protected sites need additional slope/cliff, sinkhole, or buffer area protection to be considered fully protected for delisting purposes. Monkshood also needs additional protection across its range to include sites in Iowa and Wisconsin.

Leedy's roseroot
Leedy's roseroot was listed as threatened in 1992 because of its low numbers, few and disjunct populations, and specialized cliffside habitat. It is also listed as threatened by the state of Minnesota. The recovery plan was approved in 1998. The plant is found in only specialized cliffside habitat. In Minnesota, it occurs on maderate cliffs which are cooled by air exiting underground passages. There are only three populations in New York and four in Minnesota. One site in Minnesota is owned by the Department of Natural Resources. Besides its disjunct occurrences and low numbers, the major threats are on-site disturbances and groundwater contamination.

Leedy's roseroot may be considered for delisting when all three privately owned Minnesota populations are protected by conservation easements or fee title acquisition by a public agency or private conservation organization, the contamination threat is removed from the fourth Minnesota population, and specific protection measures are taken for New York populations. Protected populations must be geographically distinct, self-sustaining, and have been protected for five consecutive years by measures that will remain effective following delisting. Additional tasks needed include locating new populations, determining the hydrologic relationship of cliffs with upland areas, securing funding for site protection, securing landowner involvement, implementing monitoring, providing public education, and maintaining a genetic bank.

Glacial relict snails
Eight glacial relict snail species and one plant species that are also associated with algific talus slope or cliff habitats are on the Service's draft species of concern list and a status assessment for taxa under consideration for listing is currently being completed for them by Region 3. These species are the snails *Vertigo brierensis*, *V. hubrichti hubrichti*, *V. hubrichti variabilis*, *V. iowaensis*, *V. meramecensis*, *Catinella gelida*, *Novisuccinea* n. sp. *minnesota a*, *Novisuccinea* n. sp *minnesota b*, and the plant golden saxifrage *(Chrysosplenium iowense).* These species sometimes occur with the above threatened and endangered species, but also occur on sites without them. They occur in Iowa, Minnesota, and Wisconsin and some, or all, are listed as threatened or endangered by each of these states. Since they occur on the same fragile habitat with similar threats, permanent protection measures are also important to their continued existence.

Background
The original land protection plan (LPP, U.S. Fish and Wildlife Service 1986) outlined the purposes, objectives, protection alternatives, and proposed action for the Refuge. The LPP outlined protection of approximately 25 sites containing approximately 700 acres in eight counties (Figure 1). The project at that time was expected to bring approximately 70 percent of the known Northern monkshood population and 75 percent of the known Iowa Pleistocene snail population under direct USFWS protection. This was to be accomplished by purchasing the 18 largest monkshood and nine largest snail sites. Appropriations in 1989 and 1996 have been used to purchase (fee title) 781 acres that protects 11 monkshood sites and 8 snail sites. Nine of these monkshood sites are among the

largest 18 sites and only one snail site is among the nine largest sites. Eight of these other largest sites are at least partially protected by other agencies or organizations.

In 1993, a preliminary project proposal (PPP) was approved by the Director of the Fish and Wildlife Service to develop a detailed plan to acquire up to an additional 6,220 acres in 25 counties in Illinois, Iowa, Minnesota, and Wisconsin (Figure 1) to protect enough monkshood and Iowa Pleistocene snail sites for recovery goals and to protect other rare species associated with algific talus slopes and similar rare habitats. The PPP also added acquisition areas for the plant, Leedy's roseroot (*Sedum integrifolium ssp leedyi*), which was listed as threatened in 1992 and grows on similar habitat in southeast Minnesota. Its primary recovery goal is also permanent protection (U.S. Fish and Wildlife Service 1998). The PPP also targeted protection of the plants golden saxifrage (*Chrysosplenium iowense*) and sullivantia (*Sullivantia sullivantia*), and eight species of glacial relict land snails that are associated with algific talus slopes and similar habitats throughout the Driftless Area (Frest 1991). At that time these were all Category 2 candidate species for federal listing[1]. Some of these species occur only in the Driftless Area, or the majority of their populations occur in the Driftless Area. Known locations were from surveys done in the 1980s (Frest 1982-1987) (Figure 3).

Since that time, sullivantia was found to occur more commonly on cliff habitats in Wisconsin and Iowa. It is now state listed in Illinois and Minnesota and is not a U.S. Fish and Wildlife Service species of concern. Some of the counties proposed in the 1993 PPP were included only for protection of sullivantia and are not considered areas for potential acquisition in this 2004 expansion proposal (Figure 1). Mitchell County in Iowa contains only two sites which are already protected in a county park. Therefore, this county was removed from the 2004 expansion proposal. Crawford County, Wisconsin was added to the 2004 expansion proposal because of its potential to contain habitat for endangered species and species of concern.

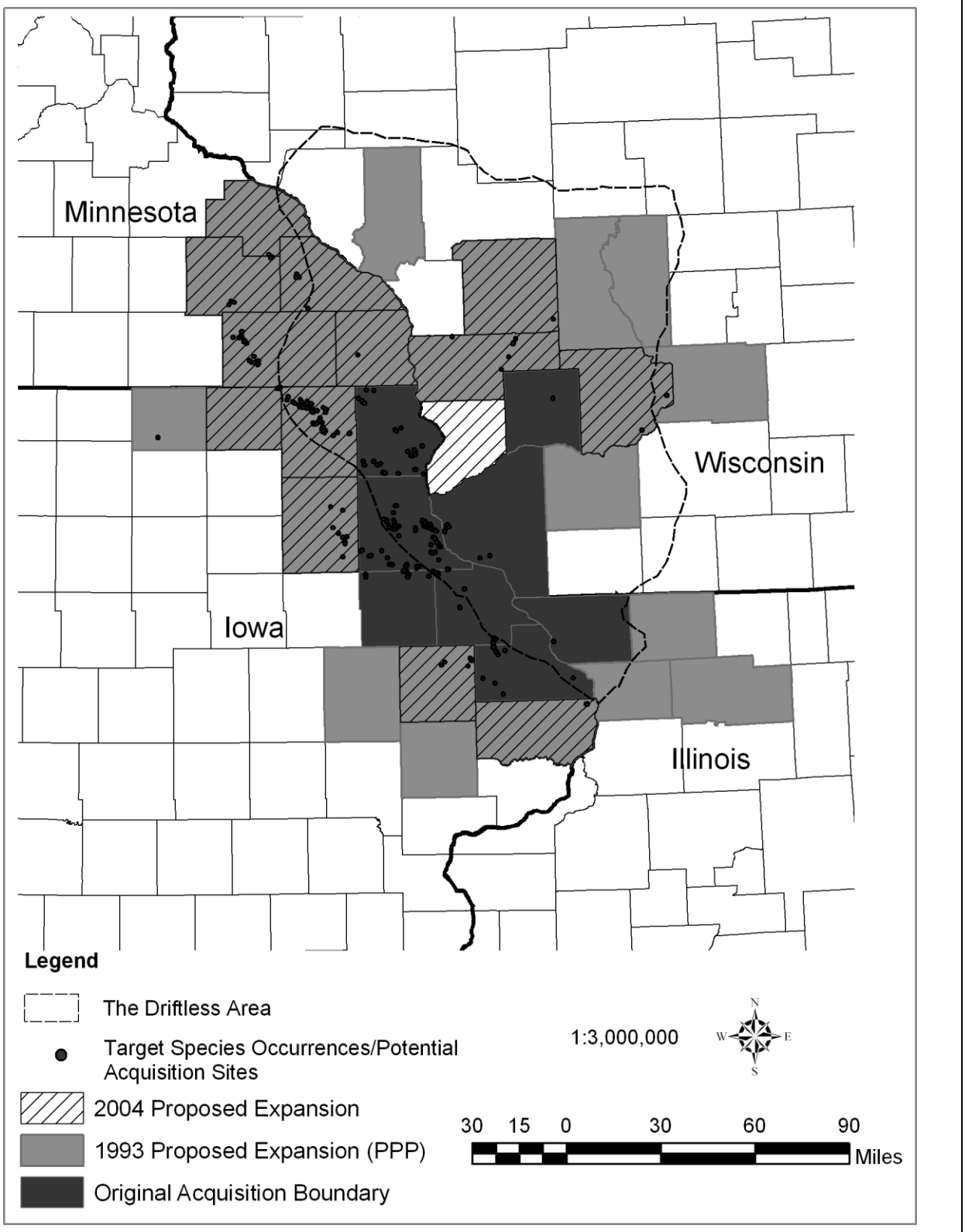
Thus, the number of counties where acquisition could occur is now 22. This includes the eight counties in the original acquisition area for the Refuge. The other species above are included in a preliminary draft species of concern list for Region 3. None are candidate species at this time.

The Refuge did not pursue further study for the 1993 PPP until the Comprehensive Conservation Plan process began in 2002. The CCP planning effort was the logical time to examine all management and land protection issues related to the Refuge. The preferred alternative within the environmental impact statement that accompanies the CCP proposes an expanded Refuge boundary of 2,275 acres. This expansion is part of an eventual total of approximately 6,000 acres to the Refuge. The expanded boundary allows the potential protection of any of these species' populations across their range. Protection across the geographic range of these species is important to preserve genetic diversity, sites with larger populations, potential reintroduction sites, and sites that may contain other rare species. Acquisition within this expanded boundary would not occur at every species location, but would allow protection of the majority of sites with viable populations to ultimately reach delisting goals and prevent listing of species of concern.

Refuge land acquisition is aimed at protecting the entire algific slope system at each site, including upland sinkholes and buffer area around the slope. Many of the currently protected algific slopes on the Refuge do not have adequate protection of sinkholes nor provide buffer from adjacent agricultural or other uses.

1. *The Service discontinued the use of a list of "category 2 candidates" in 1996. None of these species are currently candidates for listing under the Endangered Species Act.*

Figure 3: Target Species Occurrences, Driftless NWR



Habitats on acquired lands will be restored to pre-European settlement vegetation when possible. Lands will be opened to compatible wildlife-dependent recreation only when there is sufficient buffer area around endangered species habitat, sufficient public access, and the ability to conduct law enforcement on a regular basis.

II. Threats to and Status of the Resource

Land acquisition is focused on protecting a specific type of endangered species habitat, but also includes forest, grassland, cropland, and streams surrounding the endangered species to protect sinkholes and provide buffer areas. The surrounding vegetation can influence temperature on the algific slopes, a required component of the habitat for these species. The algific talus slopes are fragile and cannot be restored once damaged or destroyed. The threats to these sites are cattle grazing, logging, quarrying, building or development, invasive species, sinkhole filling, erosion, human traffic, pesticides, and natural landslides. Without some form of protection, populations of these species could be lost from one event.

III. Proposed Action and Objective

The primary purpose of this project is to permanently protect and preserve a sufficient portion of the Northern monkshood and Iowa Pleistocene snail populations so that both species can be delisted. With relatively little additional protection, recovery goals for permanent protection of habitat could be met for the Iowa Pleistocene snail to result in delisting.

A secondary purpose of this project is to permanently protect and preserve populations of other species of federal concern, specifically golden saxifrage and glacial relict snail species. Potential reintroduction sites for listed species would also be preserved. The project would also conserve biological integrity and diversity or a unique habitat type, a goal of the National Wildlife Refuge System.

The Service proposes to acquire approximately 6000 acres that includes approximately 200 ownerships (Figures 4-9, pages 181-186, and Table 1 on page 187). Acreages of individual tracts have been determined for sites containing the three federally listed species. However, sites that contain only species of concern need further study to delineate tract boundaries (Figures 4-9). Acreage estimates are given for these study sites (Table 1), but exact boundaries have not yet been determined. We estimate that the cost of acquiring all land proposed would be from $6 million to $12 million. The primary funding for acquisition would be from money appropriated from the Land and Water Conservation Fund. Since acquisition would only be from willing sellers, it is likely that if this acquisition were to occur, it would be over a period of 10-25 years. Because CCPs detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes, the CCP and this Land Protection Plan do not constitute a commitment for funding for future land acquisition.

Any acquired lands would become part of the Refuge. Operations costs will ultimately depend upon the amount of land purchased in fee and easement and habitat restoration requirements.

IV. Protection Alternatives

This section outlines and evaluates two strategic alternatives for the conservation of approximately 6000 acres of scattered tracts in the counties shown in Figure 1. The two protection alternatives discussed below are included in the alternatives considered in the Driftless Area NWR

Comprehensive Conservation Plan Environmental Impact Statement (EIS). Protection Alternative A is incorporated into Alternative A of the EIS. Protection Alternative B is incorporated into Alternatives B and C of the EIS.

Alternative A (No Action):

Under this alternative, the Service would not seek any additional realty interests in land and water. The Refuge would continue to contact landowners to assist them with conserving endangered species on their land. For example, the Refuge may help them fund fencing to exclude cattle through endangered species recovery funding, the Service's Partners for Wildlife Program, or through state programs. The Refuge would assist partners in securing funding and conserving sites through a variety of means such as Endangered Species Act Section 6 grants to states, conservation easements held by land trust groups like The Nature Conservancy or Iowa Natural Heritage Foundation, or U.S. Department of Agriculture programs.

Alternative B (Preferred):

The Service would facilitate the protection of approximately 150 acres per year from willing sellers using outreach and technical assistance, conservation easements and fee-title purchase of land (and/or donations from private parties) or a combination of all methods, depending on site, circumstances, and landowner interests. The estimate of 150 acres per year is based on historical funding levels in the Service's Region 3, which includes Iowa, Illinois, Wisconsin, and Minnesota. Any acquisition of lands would be from willing sellers only, regardless of the type of interest. The Service would acquire the land interests necessary to reach recovery and delisting goals for the Iowa Pleistocene snail, Northern monkshood, and Leedy's roseroot.

Areas acquired in fee-title through donation or purchase would be owned by the Service and managed as part of the Driftless Area NWR. Tracts in which an easement is negotiated would remain in private ownership. Administration, management, and monitoring of the fee title tracts and easements would be done by the staff at Driftless Area NWR. This alternative would be carried out on a tract-by-tract basis as land and funding becomes available.

If acquired, the lands would contribute to the recovery goals for the respective threatened and endangered species and to the goals of the CCP by providing permanent protection to the habitat and species colonies, and by restoring habitat surrounding endangered species.

V. Alternative Preservation Tools

Alternative preservation tools proposed for the boundary modification area are fee acquisition, conservation easements, wildlife management agreements, and private lands extension agreements. Wildlife management agreements and private land extension agreements could be used to preserve the land and endangered species until permanent protection can be gained. Permanent protection is needed to ensure the survival of the species and to reach recovery goals for delisting. Other acquisition methods that could be utilized by the Service include donations, partial donations, or transfers.

Wildlife Management Agreements

These agreements are negotiated between the Refuge Manager and a landowner that specify a particular management action the landowner will do, or not do, with his or her property. For example, an agreement may be for excluding cattle from endangered species habitat. More comprehensive agreements are possible for such things as upland restoration, or public access. These agreements are strictly voluntary on the part of the landowner and are voided if the property is sold.

As long as a landowner abides by the terms of the agreement, this protection can be effective in meeting certain preservation objectives. Unfortunately, because these agreements are voluntary and temporary, there is no long-term assurance the terms will continue to be met.
Direct Service costs for this alternative are generally low, but can add up to near fee or easement costs if the agreement is for several years. Staff time and administrative costs are relatively high since agreements must be monitored yearly and renegotiated when land ownership changes.

Leases

Under a lease agreement, the Service would negotiate with a landowner to receive use of the land or for maintenance of the land in a given condition. Generally, the landowner would receive an annual lease payment. For example, the Service could lease 40 acres of grassland habitat to protect sinkholes, part of the algific slope system. The landowner would be paid to maintain the area as grassland and not use it for row crops.

Cost effectiveness of leases would vary depending on the length and payment terms of the lease. In many cases, the cost of a lease rapidly approaches the cost of outright purchase in a few years. Also, leases do not offer the long-term protection of habitat, and are more complex for the Service to administer than fee or easement because of the monitoring, coordination, and administration requirements.

Conservation Easements

With a conservation easement, the Service in effect purchases a specific interest from a private landowner. For example, the Service may purchase a wetland easement that protects a wetland from draining, filling, and burning. The landowner gives up the right to drain, fill, and burn, but no other land rights. The wetland may still be cropped, or hayed, as natural conditions allow.
An easement that is commonly used on refuges is a conservation or non-development easement. Typically, a landowner would agree to refrain from commercial, industrial, or residential development or other major alteration of habitat. The landowner would continue to use the land as before the easement and retain rights such as hunting and control of trespass, for instance. Easements are voluntary and purchased only from willing sellers. Payments for conservation easements are generally based on a percentage of the appraised value of the land and vary according to the use restrictions imposed. Easements are most often perpetual and compensation is a one-time, up-front payment.

Easements can be useful when existing land use of a tract is partially compatible with the refuge purposes, and when the landowner desires to use the land for some compatible purpose. Examples of land uses that are normally restricted under terms of a conservation easement include:

- Development rights – agricultural, commercial and residential.
- Alteration of natural topography.
- Uses negatively affecting the maintenance of plant and wildlife communities.
- Excessive public access and use; and
- Alteration of natural water level.

Depending on the type of easement, this option may be cost effective in meeting certain Refuge management purposes. Some easements, however, may cost the Service more than 75 percent of fee value and cost efficiency is compromised. If the easement is not perpetual, long term resource protection is not guaranteed.

Easements are more difficult to manage than fee title transactions because of the monitoring, coordination, and administrative requirements. If a landowner fails to honor the easement contract, the Service must take steps to re-establish the terms of the contract. Changes in land ownership on which an easement exists are frequently a source of difficulty and expense to the Service.

In the short run, easements have more impact on the tax base of local municipalities than cooperative management agreements and leases, but less impact than fee-title acquisition. In the long run, Service acquisition of interest in lands may be beneficial to the tax base of local municipalities because of increased desirability of land and increased recreational opportunities.

Fee-Title Acquisition

Fee-title acquisition of land assures permanent protection of resources. All rights of ownership are transferred to the Service in fee title acquisition. Land is purchased only from willing sellers with offers based on fair market value appraisals. Some fee title acquisitions are accomplished through donation or exchange. Although initially the most costly for the Service, in the long run, lands acquired in fee-title are easier to manage and plan for because the Service has complete control. Staff time is saved by not having to renegotiate terms for less-than-fee title arrangements.
In the short run, fee-title acquisition will have the greatest impact on the tax base of local municipalities of any alternative preservation tools. The impact from reduced tax revenues to local government in offset by revenue sharing payments from the Service. In the long run, Service acquisition of interest in lands may be beneficial to the tax base of local municipalities because of increased desirability of land and increased recreational opportunities.

VI. Coordination

The Service has approved recovery plans for the three federally listed species discussed in this plan. These recovery plans were reviewed by cooperating and affected State and Federal agencies. These three recovery plans recommend habitat protection, including acquisition as priority recovery tasks or actions.

In addition to being federally listed, the Iowa Pleistocene snail is listed as endangered by the state of Iowa and the monkshood is listed as threatened by Iowa and Wisconsin. Leedy's roseroot is listed as threatened by Minnesota. Some protection and/or acquisition efforts are being carried out by all three states with Wisconsin owning part or all of three sites (harboring less than 500 monkshood plants), Iowa owning fourteen of approximately 100 monkshood or snail sites within the state, and Illinois DOC having a nonbinding conservation agreement on its only site. The Nature Conservancy (TNC) previously had an active acquisition program in Iowa and Wisconsin. TNC owns several preserves in Iowa for these species. The Refuge currently has close coordination with The Nature Conservancy and that is expected to continue. The Iowa Natural Heritage Foundation has also assisted the Refuge with protection of endangered species habitat and expects to continue when possible. All four states have expressed support for Refuge land acquisition during CCP coordination and expressed support for the original LPP.

Because of the fragile nature of algific slope sites, precise locations will not be publicly disclosed. Many landowners have been contacted recently by Refuge staff and were contacted in the past by The Nature Conservancy. All landowners with listed species on their land have been told about the species and the desire of the Service to purchase the land. Not all adjacent landowners who own sinkholes or buffer areas have been contacted. The majority of landowners contacted are impressed with the importance of their sites and understand the need to protect them.

VII. Sociocultural Impacts

Restoration, preservation, and management of additional lands by the Service will have little negative effect on the current lifestyles of individuals and communities in and around the Refuge. Lands acquired will be small scattered tracts from 10 to 200 acres. Landowners who choose to sell their land to the Service will be most affected. Where acquired lands contain home sites, owners who relocate will be reimbursed for moving expenses. Renters also receive certain relocation benefits, including assistance in finding suitable alternate housing that is affordable. In accordance with the

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Public Law 91-646), displaced persons are provided relocation payment assistance for the costs of relocation in addition to advisory services. Under certain conditions, some homeowners may be able to reserve a "life estate" on their homes, meaning they could remain in their homes for the rest of their lives after selling to the Service. This type of reservation does, however, reduce the amount paid for their homes. Other landowners who negotiate easements or other less-than-fee transactions may have to change certain land management practices to comply with conditions of the easement.

All land transactions will be purely voluntary in keeping with Service policy to purchase lands or rights only from willing sellers. The property rights of landowners who choose not to sell their land will not be directly affected by purchases around them since they will retain all right of land ownership. The Service will always take into account the interests of adjacent landowners when managing acquired land.

Lands in which the Service acquires a fee interest will be open to compatible Refuge public uses when sufficient buffer around the endangered species locations is present, and when there is sufficient public access. Endangered species habitat will always be closed to all public entry. Public use of the Refuge probably will not increase markedly over current levels. Tracts will be fenced when necessary to exclude neighboring livestock.

VIII. Summary of Proposed Action

The priority of acquisition of parcels will be determined by recovery goals, refuge purposes, goals and objectives in the CCP, the species present and the population size, the importance of the location in conserving genetic diversity, and proximity to existing Refuge tracts.

The following is a ranked list of priorities for protecting lands with these threatened and endangered species. This list will help assure that the limited resources available to the Service are used efficiently and effectively.

High Priority Land:

- Lands adjacent to existing Refuge tracts that would add needed buffer, protect sinkholes or provide better access for management.
- Iowa Pleistocene snail sites with large populations or outlying populations (i.e. Illinois) that may be important for genetic reasons.
- Any of the three Leedy's roseroot populations in Minnesota.
- Monkshood sites with large populations.
- Sites with more than one threatened and endangered species and species of concern.
- Sites with an immediate threat.

Medium Priority Land:

- Iowa Pleistocene snail sites with small populations
- Northern monkshood sites with small populations
- Sites that only contain species of concern, but large populations

Low Priority Land

- Northern monkshood sites with fewer than 100 plants
- Iowa Pleistocene snail sites where snails have not been located in the last 10 years.
- Sites that only contain species of concern.
- Sites that have been significantly disturbed or degraded.

Contact with landowners is currently maintained on an annual or more frequent basis to ensure the sites are protected in the meantime and to inquire about selling. Future acquisition would be dependent on the availability of funds.

References

Frest, T.J. 1982. Project SE-1-4 Iowa Pleistocene snail final report. University of Iowa, Iowa City, IA 162pp.

Frest, T.J. 1983. Final report northern driftless area survey. University of Iowa, Iowa City, IA. 17pp.

Frest, T.J. 1985. Final report Iowa Pleistocene snail survey. University of Washington, Seattle, WA. 37pp.

Frest, T.J. 1986. Final report Iowa Pleistocene snail survey. University of Washington, Seattle, WA. 26pp.

Frest, T.J. 1987. Final report Iowa Pleistocene snail project. University of Washington, Seattle, WA. 39pp.

Frest, T. J. 1991. Summary status reports on eight species of candidate land snails from the driftless area (paleozoic plateau), upper Midwest. Seattle, WA

U.S. Fish and Wildlife Service. 1983. National recovery plan for northern monkshood (*Aconitum noveboracense*). U.S. Fish and Wildlife Service, Twin Cities, MN. 81pp.

U.S. Fish and Wildlife Service. 1984. National recovery plan for Iowa Pleistocene snail (*Discus macclintocki* (Baker)). U.S. Fish and Wildlife Service, Twin Cities, MN. 23pp + app.

U.S. Fish and Wildlife Service. 1986. National driftless area land protection plan. U.S. Fish and Wildlife Service, Twin Cities, MN. 20pp.

U.S. Fish and Wildlife Service. 1998. Sedum integrifolium spp. Leedyi (Leedy's roseroot) Recovery Plan. Ft. Snelling, MN. 31pp.

Figure 4: Driftless Area NWR LPP Map Locator

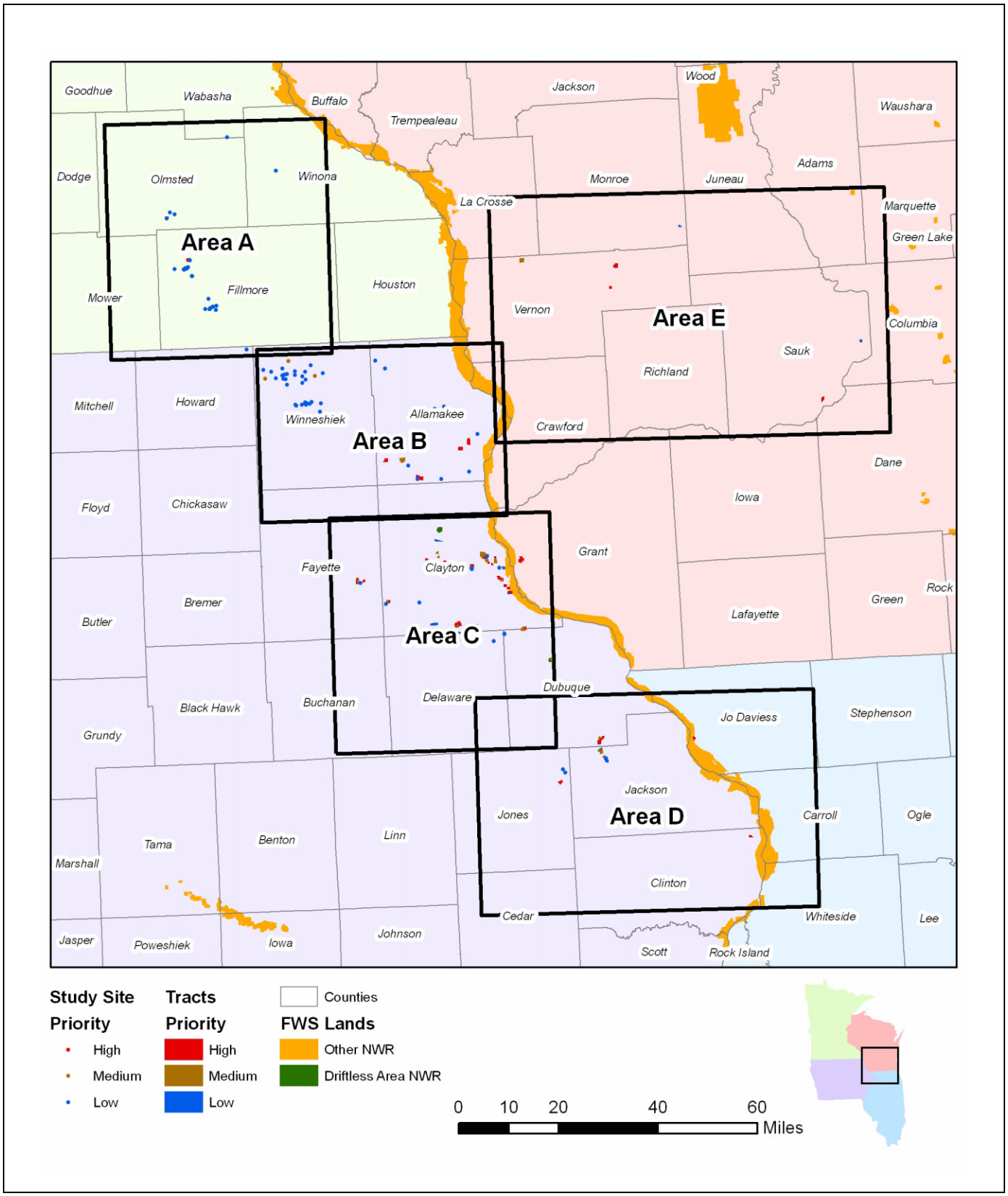


Figure 5: Area A, Driftless Area NWR Land Protection Plan

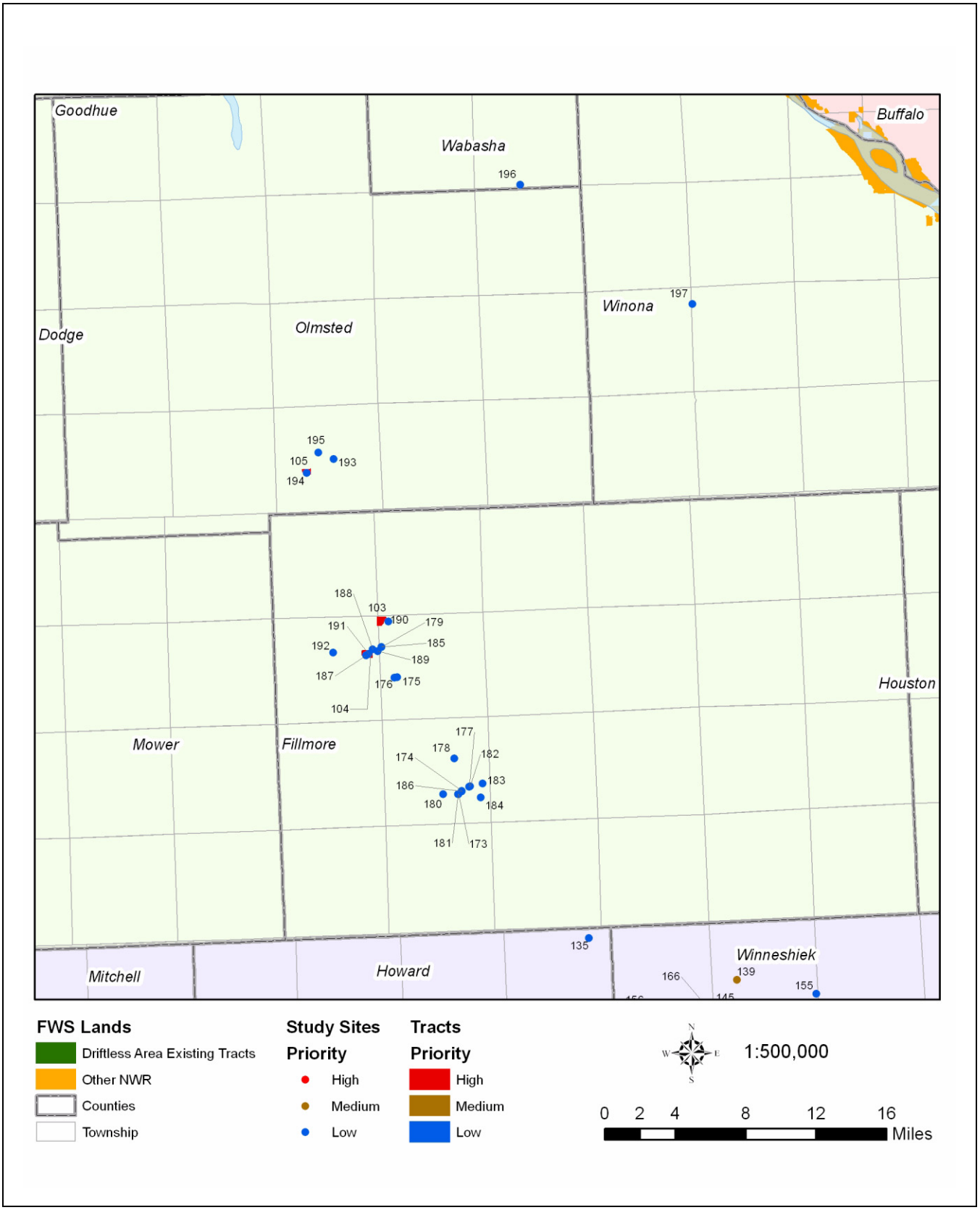


Figure 6: Area B, Driftless Area NWR Land Protection Plan

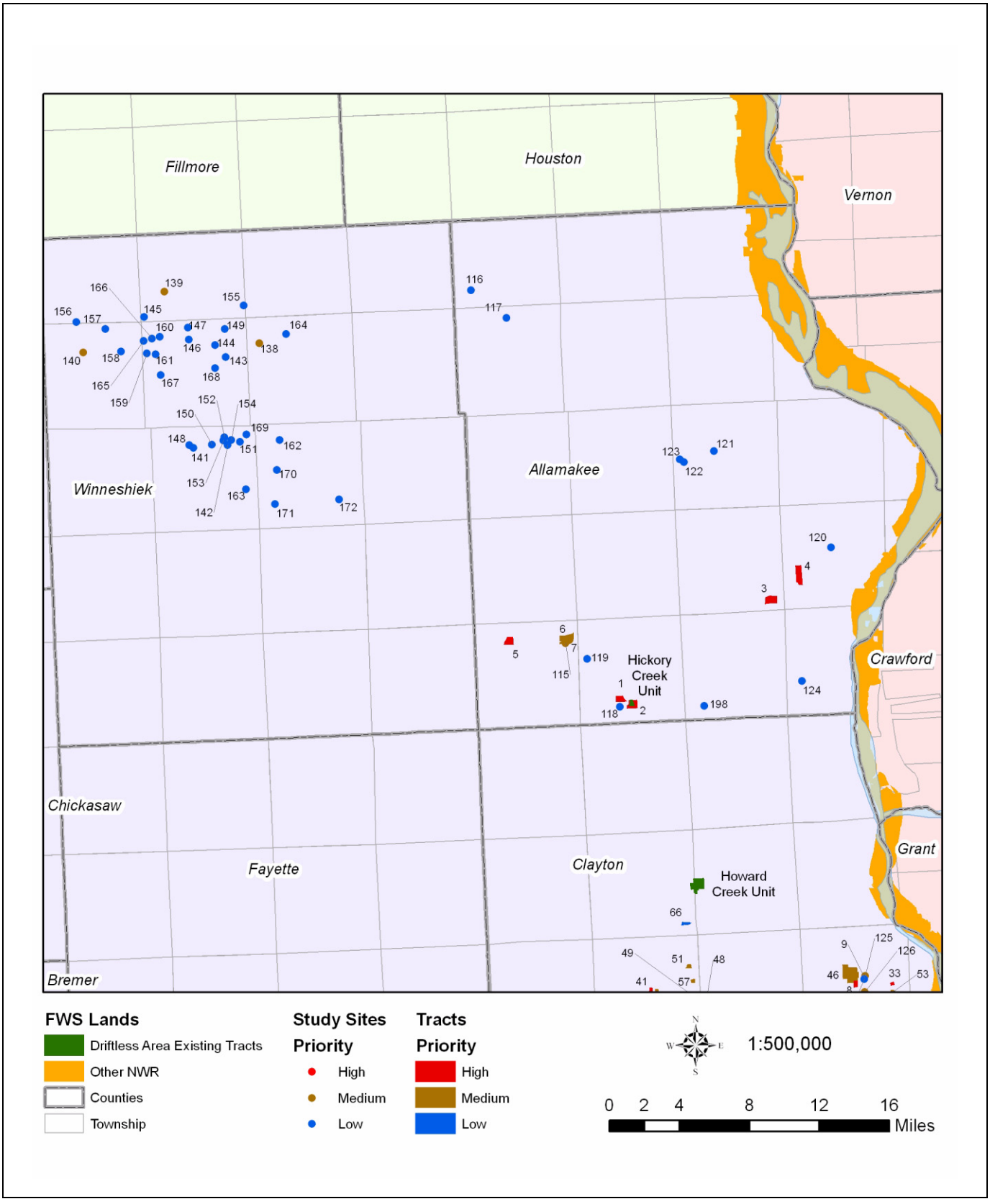


Figure 7: Area C, Driftless Area NWR Land Protection Plan

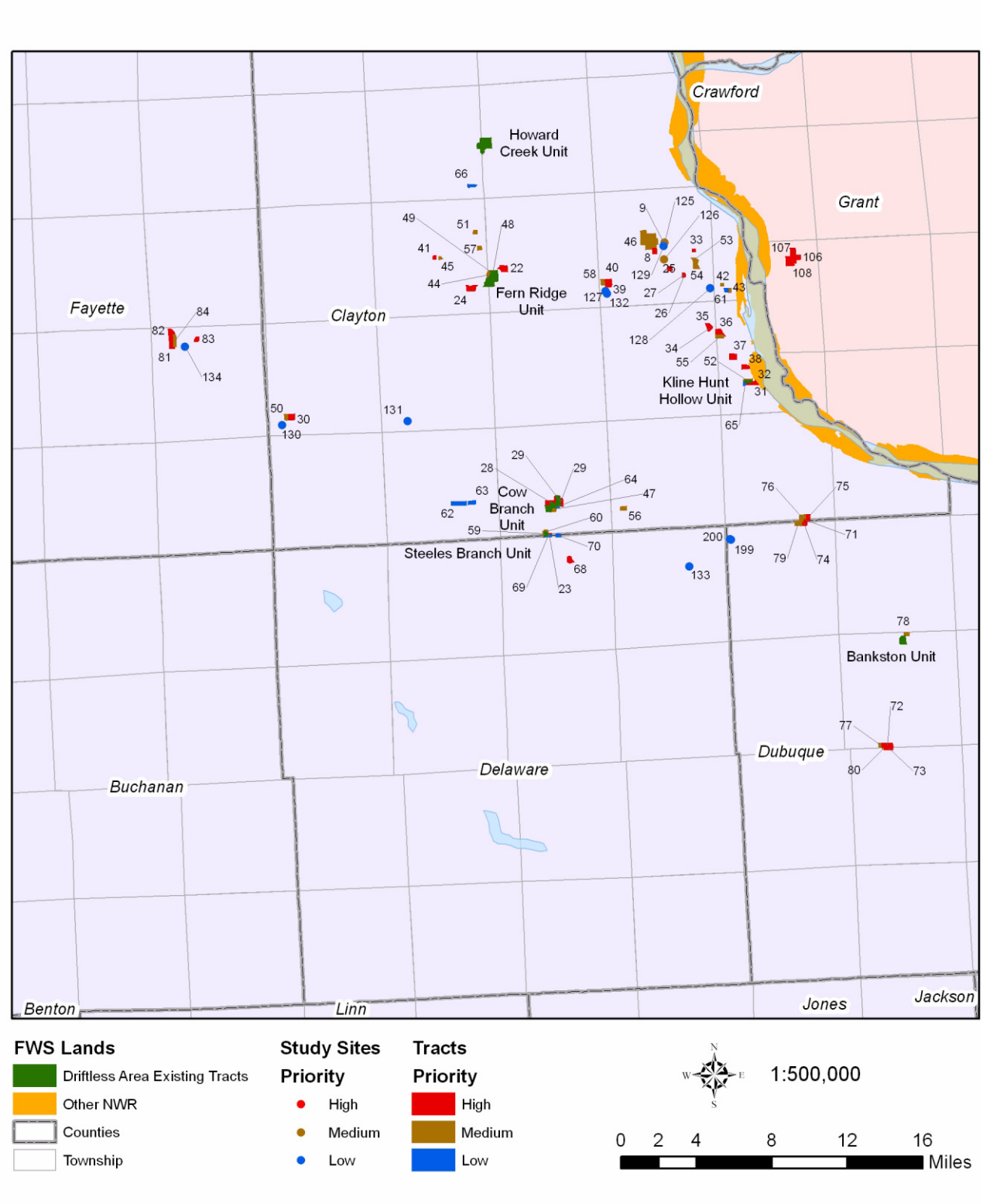


Figure 8: Area D, Driftless Area NWR Land Protection Plan

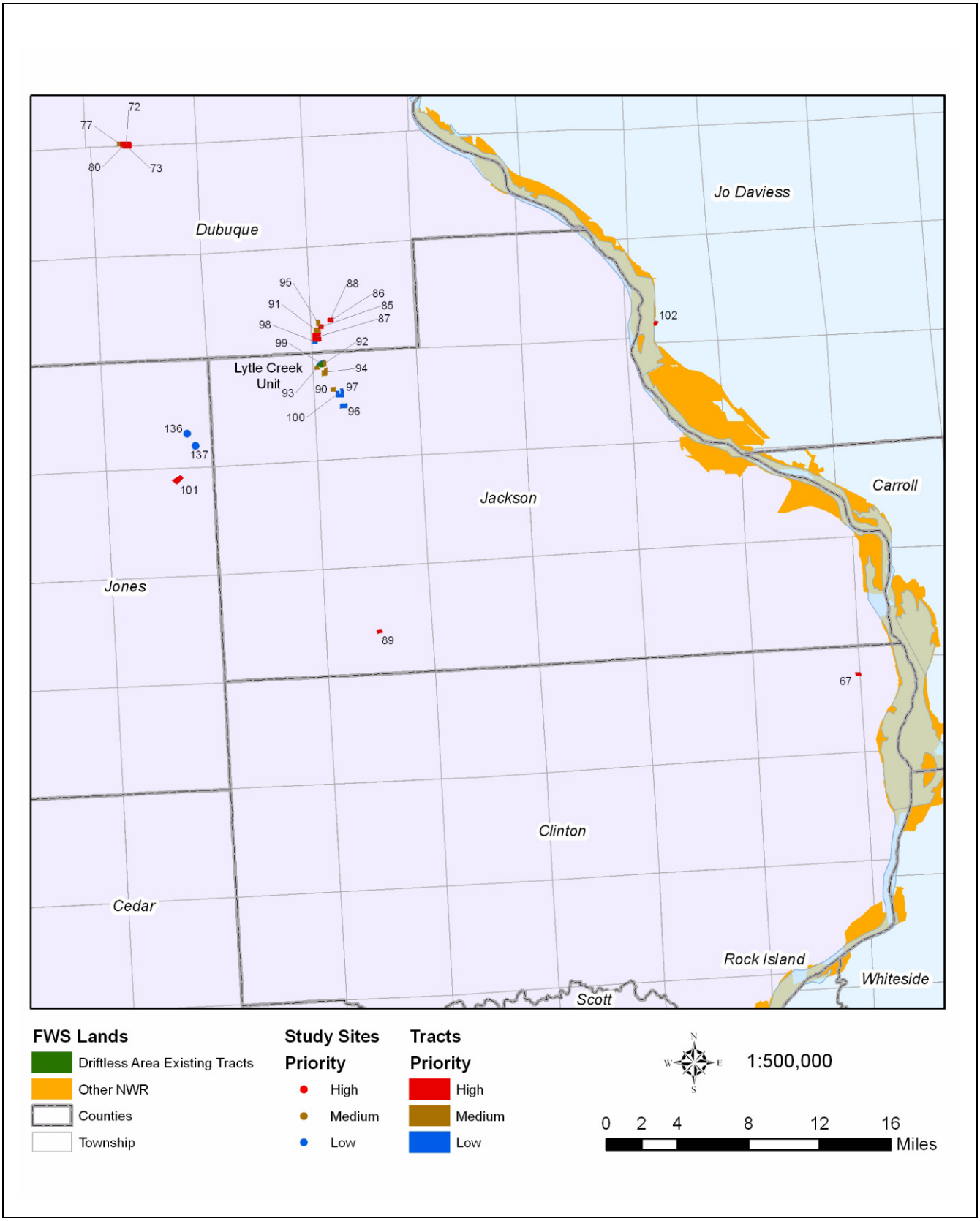


Figure 9: Area E, Driftless Area NWR Land Protection Plan

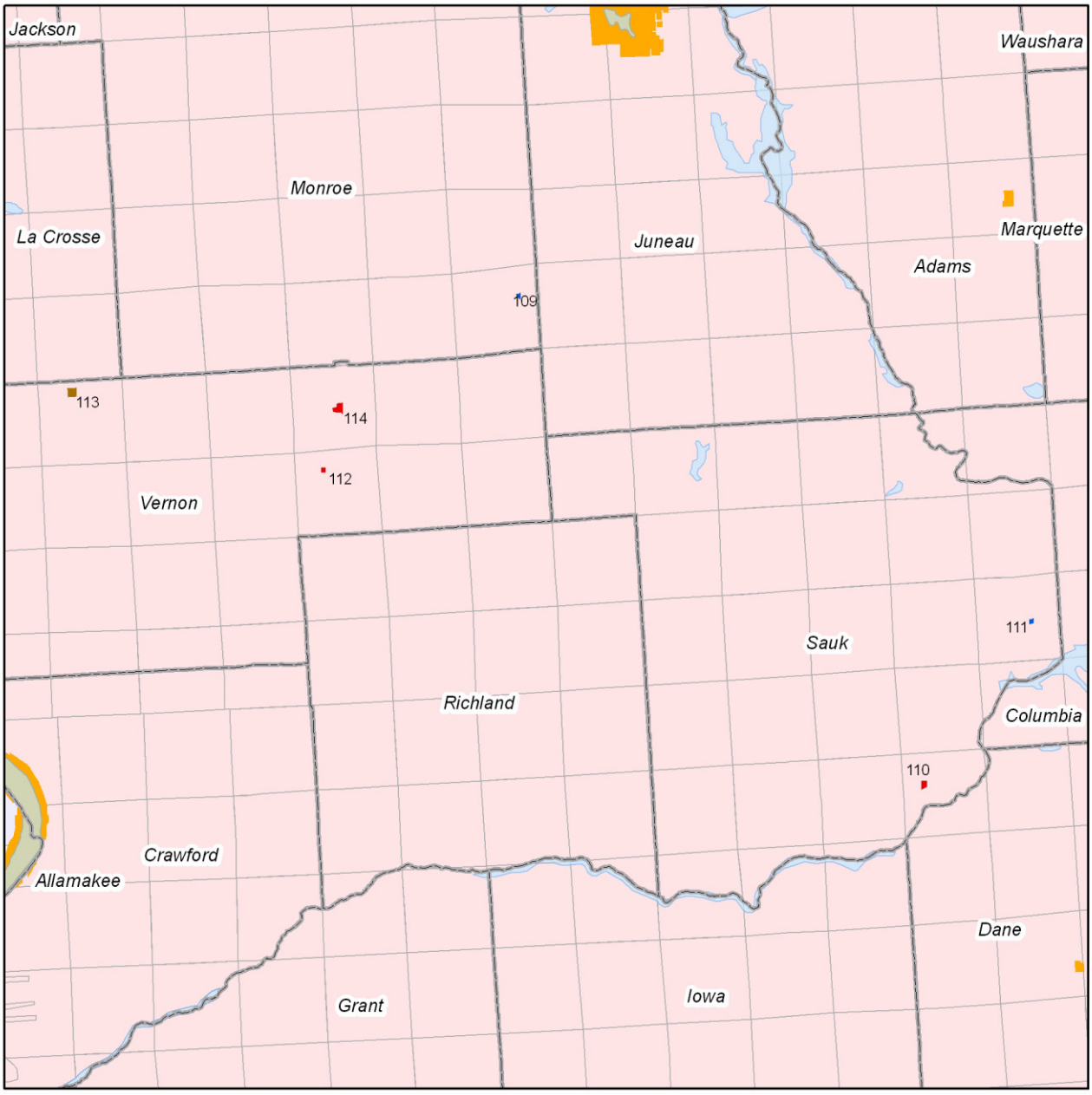


Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
1	Tract	Allamakee, IA	61.5	High	Monkshood, Glacial Relict Snail
2	Tract	Allamakee, IA	98.4	High	Monkshood, Glacial Relict Snail
3	Tract	Allamakee, IA	121.5	High	Monkshood, Golden Saxifrage
4	Tract	Allamakee, IA	146.0	High	Monkshood
5	Tract	Allamakee, IA	81.3	High	Monkshood
6	Tract	Allamakee, IA	99.5	Medium	Monkshood
7	Tract	Allamakee, IA	43.7	Medium	Monkshood
115	Site	Allamakee, IA	25	Medium	
116	Site	Allamakee, IA	20	Low	Glacial Relict Snail
117	Site	Allamakee, IA	20	Low	Glacial Relict Snail
118	Site	Allamakee, IA	20	Low	Glacial Relict Snail
119	Site	Allamakee, IA	10	Low	Glacial Relict Snail
120	Site	Allamakee, IA	15	Low	Glacial Relict Snail
121	Site	Allamakee, IA	20	Low	Glacial Relict Snail
122	Site	Allamakee, IA	20	Low	Glacial Relict Snail
123	Site	Allamakee, IA	25	Low	Glacial Relict Snail
124	Site	Allamakee, IA	25	Low	Glacial Relict Snail
198	Site	Allamakee, IA	20	Low	Golden Saxifrage
8	Tract	Clayton, IA	21.6	High	Iowa Pleistocene Snail
9	Tract	Clayton, IA	13.1	High	Iowa Pleistocene Snail, Glacial Relict Snail
22	Tract	Clayton, IA	52.6	High	Iowa Pleistocene Snail, Glacial Relict Snail
23	Tract	Clayton, IA	6.8	High	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
24	Tract	Clayton, IA	57.2	High	Monkshood
25	Tract	Clayton, IA	14.9	High	Monkshood

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
26	Tract	Clayton, IA	3.3	High	Monkshood, Glacial Relict Snail
27	Tract	Clayton, IA	5.0	High	Monkshood, Glacial Relict Snail
28	Tract	Clayton, IA	89.8	High	Monkshood
29	Tract	Clayton, IA	38.3	High	Monkshood, Golden Saxifrage
30	Tract	Clayton, IA	60.2	High	Iowa Pleistocene Snail, Glacial Relict Snail
31	Tract	Clayton, IA	42.6	High	Monkshood, Glacial Relict Snail, Golden Saxifrage
32	Tract	Clayton, IA	1.1	High	Monkshood, Glacial Relict Snail, Golden Saxifrage
33	Tract	Clayton, IA	4.8	High	Monkshood, Iowa Pleistocene Snail
34	Tract	Clayton, IA	22.5	High	Monkshood
35	Tract	Clayton, IA	14.4	High	Monkshood
36	Tract	Clayton, IA	59.5	High	Monkshood
37	Tract	Clayton, IA	47.0	High	Monkshood
38	Tract	Clayton, IA	31.4	High	Monkshood
39	Tract	Clayton, IA	15.9	High	Iowa Pleistocene Snail
40	Tract	Clayton, IA	39.7	High	Iowa Pleistocene Snail
41	Tract	Clayton, IA	8.0	High	Monkshood
42	Tract	Clayton, IA	5.8	Medium	Monkshood
43	Tract	Clayton, IA	16.5	Medium	Monkshood
44	Tract	Clayton, IA	31.5	Medium	Iowa Pleistocene Snail
45	Tract	Clayton, IA	3.5	Medium	Monkshood
46	Tract	Clayton, IA	366.9	Medium	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
47	Tract	Clayton, IA	28.7	Medium	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
48	Tract	Clayton, IA	1.3	Medium	Iowa Pleistocene Snail
49	Tract	Clayton, IA	1.5	Medium	Iowa Pleistocene Snail
50	Tract	Clayton, IA	19.9	Medium	Iowa Pleistocene Snail, Glacial Relict Snail
51	Tract	Clayton, IA	12.4	Medium	Monkshood
52	Tract	Clayton, IA	28.3	Medium	Monkshood, Glacial Relict Snail
53	Tract	Clayton, IA	7.8	Medium	Monkshood
54	Tract	Clayton, IA	56.3	Medium	Monkshood
55	Tract	Clayton, IA	26.7	Medium	Monkshood
56	Tract	Clayton, IA	25.4	Medium	Monkshood, Golden Saxifrage
57	Tract	Clayton, IA	11.0	Medium	Monkshood
58	Tract	Clayton, IA	36.5	Medium	Iowa Pleistocene Snail
59	Tract	Clayton, IA	7.1	Medium	Monkshood
60	Tract	Clayton, IA	10.5	Medium	Monkshood
125	Site	Clayton, IA	20	Medium	Glacial Relict Snail
126	Site	Clayton, IA	30	Medium	Glacial Relict Snail
61	Tract	Clayton, IA	13.1	Low	Monkshood
62	Tract	Clayton, IA	63.9	Low	Monkshood, Iowa Pleistocene Snail, Golden Saxifrage
63	Tract	Clayton, IA	25.7	Low	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
64	Tract	Clayton, IA	6.5	Low	Monkshood, Golden Saxifrage
65	Tract	Clayton, IA	6.9	Low	Monkshood, Glacial Relict Snail, Golden Saxifrage

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
66	Tract	Clayton, IA	14.2	Low	Monkshood
127	Site	Clayton, IA	20	Low	Glacial Relict Snail
128	Site	Clayton, IA	20	Low	Glacial Relict Snail
129	Site	Clayton, IA	30	Low	Glacial Relict Snail
130	Site	Clayton, IA	20	Low	Glacial Relict Snail
131	Site	Clayton, IA	15	Low	Glacial Relict Snail
132	Site	Clayton, IA	15	Low	Glacial Relict Snail
67	Tract	Clinton, IA	11.6	High	Iowa Pleistocene Snail
68	Tract	Delaware, IA	30.5	High	Monkshood
69	Tract	Delaware, IA	14.0	Low	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
70	Tract	Delaware, IA	14.2	Low	Monkshood, Golden Saxifrage
133	Site	Delaware, IA	20	Low	Glacial Relict Snail
71	Tract	Dubuque, IA	24.0	High	Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
72	Tract	Dubuque, IA	46.2	High	Iowa Pleistocene Snail
73	Tract	Dubuque, IA	37.5	High	Iowa Pleistocene Snail
74	Tract	Dubuque, IA	39.6	High	Monkshood, Iowa Pleistocene Snail,
75	Tract	Dubuque, IA	34.3	High	Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
76	Tract	Dubuque, IA	37.1	Medium	Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
77	Tract	Dubuque, IA	15.4	Medium	Iowa Pleistocene Snail
78	Tract	Dubuque, IA	13.7	Medium	Iowa Pleistocene Snail, Glacial Relict Snail

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
79	Tract	Dubuque, IA	35.5	Medium	Monkshood, Iowa Pleistocene Snail
80	Tract	Dubuque, IA	9.9	Medium	Iowa Pleistocene Snail
199	Site	Dubuque, IA	50	Low	Golden Saxifrage
200	Site	Dubuque, IA	30	Low	Glacial Relict Snail
81	Tract	Fayette, IA	15.2	High	Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
82	Tract	Fayette, IA	121.1	High	Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
83	Tract	Fayette, IA	17.7	High	Iowa Pleistocene Snail, Golden Saxifrage
84	Tract	Fayette, IA	26.8	Medium	Iowa Pleistocene Snail, Golden Saxifrage
134	Site	Fayette, IA	40	Low	Glacial Relict Snail, Golden Saxifrage
103	Tract	Fillmore, MN	88.7	High	Leedy Roseroot, Glacial Relict Snail
104	Tract	Fillmore, MN	114.8	High	Leedy Roseroot, Glacial Relict Snail
173	Site	Fillmore, MN	25	Low	Golden Saxifrage
174	Site	Fillmore, MN	15	Low	Glacial Relict Snail
175	Site	Fillmore, MN	20	Low	Glacial Relict Snail
176	Site	Fillmore, MN	10	Low	Golden Saxifrage
177	Site	Fillmore, MN	20	Low	Glacial Relict Snail
178	Site	Fillmore, MN	25	Low	Glacial Relict Snail
179	Site	Fillmore, MN	25	Low	Glacial Relict Snail
180	Site	Fillmore, MN	15	Low	Golden Saxifrage
181	Site	Fillmore, MN	20	Low	Glacial Relict Snail
182	Site	Fillmore, MN	20	Low	Golden Saxifrage
183	Site	Fillmore, MN	15	Low	Glacial Relict Snail

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
184	Site	Fillmore, MN	20	Low	Glacial Relict Snail
185	Site	Fillmore, MN	20	Low	Glacial Relict Snail
186	Site	Fillmore, MN	25	Low	Glacial Relict Snail
187	Site	Fillmore, MN	15	Low	Glacial Relict Snail
188	Site	Fillmore, MN	20	Low	Glacial Relict Snail
189	Site	Fillmore, MN	20	Low	Glacial Relict Snail
190	Site	Fillmore, MN	20	Low	Glacial Relict Snail
191	Site	Fillmore, MN	15	Low	Glacial Relict Snail
192	Site	Fillmore, MN	20	Low	Glacial Relict Snail
106	Tract	Grant, WI	27.4	High	Monkshood, Glacial Relict Snail
107	Tract	Grant, WI	157.4	High	Monkshood, Glacial Relict Snail
108	Tract	Grant, WI	22.2	High	Monkshood, Glacial Relict Snail
135	Site	Howard, IA	50	Low	Golden Saxifrage
85	Tract	Jackson, IA	19.8	High	Monkshood
86	Tract	Jackson, IA	16.2	High	Monkshood
87	Tract	Jackson, IA	94.0	High	Monkshood
88	Tract	Jackson, IA	10.6	High	Monkshood
89	Tract	Jackson, IA	15.1	High	Monkshood
90	Tract	Jackson, IA	18.2	Medium	Monkshood, Golden Saxifrage
91	Tract	Jackson, IA	50.3	Medium	Monkshood
92	Tract	Jackson, IA	31.2	Medium	Monkshood
93	Tract	Jackson, IA	12.4	Medium	Monkshood
94	Tract	Jackson, IA	35.4	Medium	Monkshood
95	Tract	Jackson, IA	19.2	Medium	Monkshood
96	Tract	Jackson, IA	34.7	Low	Monkshood
97	Tract	Jackson, IA	31.0	Low	Monkshood, Iowa Pleistocene Snail, Glacial Relict Snail, Golden Saxifrage
98	Tract	Jackson, IA	15.5	Low	Monkshood

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
99	Tract	Jackson, IA	8.2	Low	Monkshood
100	Tract	Jackson, IA	13.5	Low	Monkshood
102	Tract	Jo Daviess, IL	13.8	High	Iowa Pleistocene Snail
101	Tract	Jones, IA	58.5	High	Monkshood
136	Site	Jones, IA	10	Low	Glacial Relict Snail
137	Site	Jones, IA	10	Low	Glacial Relict Snail
109	Tract	Monroe, WI	13.7	Low	Monkshood
105	Tract	Olmsted, MN	52.1	High	Leedy Roseroot, Glacial Relict Snail
193	Site	Olmsted, MN	30	Low	Glacial Relict Snail
194	Site	Olmsted, MN	20	Low	Glacial Relict Snail
195	Site	Olmsted, MN	20	Low	Glacial Relict Snail
110	Tract	Sauk, WI	52.2	High	Monkshood
111	Tract	Sauk, WI	15.6	Low	Monkshood
112	Tract	Vernon, WI	20.0	High	Monkshood
114	Tract	Vernon, WI	133.4	High	Monkshood
113	Tract	Vernon, WI	149.5	Medium	Monkshood
196	Site	Wabasha, MN	15	Low	Glacial Relict Snail
138	Site	Winneshiek, IA	30	Medium	Glacial Relict Snail
139	Site	Winneshiek, IA	25	Medium	Glacial Relict Snail
140	Site	Winneshiek, IA	40	Medium	Glacial Relict Snail, Golden Saxifrage
141	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
142	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
143	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
144	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
145	Site	Winneshiek, IA	10	Low	Glacial Relict Snail
146	Site	Winneshiek, IA	30	Low	Glacial Relict Snail
147	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
148	Site	Winneshiek, IA	35	Low	Glacial Relict Snail
149	Site	Winneshiek, IA	10	Low	Glacial Relict Snail

Table 1: Driftless Area NWR Boundary Expansion Tracts (All tracts are currently in private ownership and possible acquisition would be easement or fee title.) (Continued)

Tract/Site Number	Site/ Tract	County, State	Tract Acreage (Site Est. Acres)	Priority	Species of Concern
150	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
151	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
152	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
153	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
154	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
155	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
156	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
157	Site	Winneshiek, IA	25	Low	Golden Saxifrage
158	Site	Winneshiek, IA	35	Low	Glacial Relict Snail
159	Site	Winneshiek, IA	25	Low	Glacial Relict Snail, Golden Saxifrage
160	Site	Winneshiek, IA	25	Low	Golden Saxifrage
161	Site	Winneshiek, IA	20	Low	Golden Saxifrage
162	Site	Winneshiek, IA	25	Low	Golden Saxifrage
163	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
164	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
165	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
166	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
167	Site	Winneshiek, IA	35	Low	Glacial Relict Snail
168	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
169	Site	Winneshiek, IA	20	Low	Glacial Relict Snail
170	Site	Winneshiek, IA	25	Low	Glacial Relict Snail
171	Site	Winneshiek, IA	30	Low	Glacial Relict Snail
172	Site	Winneshiek, IA	15	Low	Glacial Relict Snail
197	Site	Winona, MN	10	Low	Glacial Relict Snail

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